



Presented to
The Library
of the
University of Toronto
by
The Ontario Research
Foundation





JOURNAL
OF THE
American Veterinary Medical
Association

FORMERLY
AMERICAN VETERINARY REVIEW

Original Official Organ U. S. Vet. Med. Ass'n.

Edited and Published for
THE AMERICAN VETERINARY MEDICAL ASSOCIATION

By
J. R. MOHLER, WASHINGTON, D. C.

EXECUTIVE BOARD

George Hilton, 1st District; T. E. Munce, 2d District; S. E. Bennett, 3d
District; J. A. Kiernan, 4th District; C. E. Cotton, 5th District; R. A.
Archibald, 6th District; Cassius Way, Member at Large.

SUB-COMMITTEE ON JOURNAL

S. E. Bennett

J. A. Kiernan

Index to Volume LX

NEW SERIES VOLUME 13

October, 1921, to March, 1922

WASHINGTON, D. C.

1922

2105
~~3005~~
10.4.33



JOURNAL

OF THE

American Veterinary Medical Association

SF

601

A5

v.60

cop.2

657332

29.4.57

Index to Volume IX



LIST OF ILLUSTRATIONS

PORTRAIT OF DR. A. T. KINSLEY, 8.

PORTRAIT OF DR. DAVID S. WHITE, 10.

COMPARISON OF ABORTION IN VACCINATED AND UNVACCINATED CATTLE IN WISCONSIN
EXPERIMENTS (CHART), 31.

VETERINARIANS ATTENDING TUBERCULOSIS SHORT COURSE AT NORTH DAKOTA AGRICUL-
TURAL COLLEGE, 112.

BRONZE STATUE OF JUSTIN MORGAN, 261.

BUFFER EFFECT OF HORSE SEMEN (DIAGRAM), 296.

DOGS AFFECTED WITH ANTHRAX, 324.

SHEEP AFFECTED WITH STOMACH WORMS, 326.

INTUSSUSCEPTION IN A COLT, 329.

GENITAL INFECTIONS IN A BULL:

Figs. 1 and 2, 422.

Figs. 3 and 4, 423.

Figs. 5 and 6, 424.

EMBLEM ADOPTED BY AMERICAN VETERINARY MEDICAL ASSOCIATION, 501.

A SHETLAND PONY THAT DIED OF TUBERCULOSIS, 601.

PREVENTION OF LIVESTOCK SHIPPING LOSSES:

Fig. 1. Diaphragm and Lungs of Hog, 618.

Fig. 2. Apparatus for Sprinkling Hogs, 619.

Fig. 3. Thin Cattle, 623.

PORTRAIT OF DR. DUNCAN MCEACHRAN, 625.

RESULTS OF OPHTHALMIC TUBERCULIN TEST, 735.

THE FIFTH MEDICAL CONGRESS OF CUBA:

Portrait of Dr. Bernardo J. Crespo, 774.

Group of representatives of medical and veterinary professions, 777.

Group of special meetings, 777.

CONGENITAL ANKYLOSIS IN HIND LEGS OF CALF, 784.

LIST OF ILLUSTRATIONS

PLATE I. A. T. 1891. 1	PLATE II. A. T. 1891. 2
PLATE III. A. T. 1891. 3	PLATE IV. A. T. 1891. 4
PLATE V. A. T. 1891. 5	PLATE VI. A. T. 1891. 6
PLATE VII. A. T. 1891. 7	PLATE VIII. A. T. 1891. 8
PLATE IX. A. T. 1891. 9	PLATE X. A. T. 1891. 10
PLATE XI. A. T. 1891. 11	PLATE XII. A. T. 1891. 12
PLATE XIII. A. T. 1891. 13	PLATE XIV. A. T. 1891. 14
PLATE XV. A. T. 1891. 15	PLATE XVI. A. T. 1891. 16
PLATE XVII. A. T. 1891. 17	PLATE XVIII. A. T. 1891. 18
PLATE XIX. A. T. 1891. 19	PLATE XX. A. T. 1891. 20
PLATE XXI. A. T. 1891. 21	PLATE XXII. A. T. 1891. 22
PLATE XXIII. A. T. 1891. 23	PLATE XXIV. A. T. 1891. 24
PLATE XXV. A. T. 1891. 25	PLATE XXVI. A. T. 1891. 26
PLATE XXVII. A. T. 1891. 27	PLATE XXVIII. A. T. 1891. 28
PLATE XXIX. A. T. 1891. 29	PLATE XXX. A. T. 1891. 30
PLATE XXXI. A. T. 1891. 31	PLATE XXXII. A. T. 1891. 32
PLATE XXXIII. A. T. 1891. 33	PLATE XXXIV. A. T. 1891. 34
PLATE XXXV. A. T. 1891. 35	PLATE XXXVI. A. T. 1891. 36
PLATE XXXVII. A. T. 1891. 37	PLATE XXXVIII. A. T. 1891. 38
PLATE XXXIX. A. T. 1891. 39	PLATE XL. A. T. 1891. 40
PLATE XLI. A. T. 1891. 41	PLATE XLII. A. T. 1891. 42
PLATE XLIII. A. T. 1891. 43	PLATE XLIV. A. T. 1891. 44
PLATE XLV. A. T. 1891. 45	PLATE XLVI. A. T. 1891. 46
PLATE XLVII. A. T. 1891. 47	PLATE XLVIII. A. T. 1891. 48
PLATE XLIX. A. T. 1891. 49	PLATE L. A. T. 1891. 50
PLATE LI. A. T. 1891. 51	PLATE LII. A. T. 1891. 52
PLATE LIII. A. T. 1891. 53	PLATE LIV. A. T. 1891. 54
PLATE LV. A. T. 1891. 55	PLATE LVI. A. T. 1891. 56
PLATE LVII. A. T. 1891. 57	PLATE LVIII. A. T. 1891. 58
PLATE LIX. A. T. 1891. 59	PLATE LX. A. T. 1891. 60
PLATE LXI. A. T. 1891. 61	PLATE LXII. A. T. 1891. 62
PLATE LXIII. A. T. 1891. 63	PLATE LXIV. A. T. 1891. 64
PLATE LXV. A. T. 1891. 65	PLATE LXVI. A. T. 1891. 66
PLATE LXVII. A. T. 1891. 67	PLATE LXVIII. A. T. 1891. 68
PLATE LXIX. A. T. 1891. 69	PLATE LXX. A. T. 1891. 70
PLATE LXXI. A. T. 1891. 71	PLATE LXXII. A. T. 1891. 72
PLATE LXXIII. A. T. 1891. 73	PLATE LXXIV. A. T. 1891. 74
PLATE LXXV. A. T. 1891. 75	PLATE LXXVI. A. T. 1891. 76
PLATE LXXVII. A. T. 1891. 77	PLATE LXXVIII. A. T. 1891. 78
PLATE LXXIX. A. T. 1891. 79	PLATE LXXX. A. T. 1891. 80
PLATE LXXXI. A. T. 1891. 81	PLATE LXXXII. A. T. 1891. 82
PLATE LXXXIII. A. T. 1891. 83	PLATE LXXXIV. A. T. 1891. 84
PLATE LXXXV. A. T. 1891. 85	PLATE LXXXVI. A. T. 1891. 86
PLATE LXXXVII. A. T. 1891. 87	PLATE LXXXVIII. A. T. 1891. 88
PLATE LXXXIX. A. T. 1891. 89	PLATE LXXXX. A. T. 1891. 90
PLATE LXXXXI. A. T. 1891. 91	PLATE LXXXXII. A. T. 1891. 92
PLATE LXXXXIII. A. T. 1891. 93	PLATE LXXXXIV. A. T. 1891. 94
PLATE LXXXXV. A. T. 1891. 95	PLATE LXXXXVI. A. T. 1891. 96
PLATE LXXXXVII. A. T. 1891. 97	PLATE LXXXXVIII. A. T. 1891. 98
PLATE LXXXXIX. A. T. 1891. 99	PLATE LXXXXX. A. T. 1891. 100

Index of Authors

- Adams, John W., 144.
 Anderson, W. S., 291.
 Beach, B. A., 600.
 Beaudette, F. R., 283, 729.
 Bemis, H. E., 51.
 Blair, W. Reid, 756.
 Boerner, Fred, Jr., 83.
 Boyd, W. L., 34.
 Bushnell, L. D., 729.
 Butler, W. J., 59.
 Cahill, Edw. A., 702.
 Carr, George H., 194.
 Carroll, A. N., 315.
 Carter, Thomas B., 782.
 Cary, C. A., 329.
 Conley, C. C., 191.
 Covault, C. H., 67.
 Crawley, Howard, 461.
 Cross, Floyd, 562.
 Eichhorn, A., 771.
 Embree, W. J., 615.
 Evans, W. A., 683.
 Finkelstein, B. J., 208.
 Foster, J. P., 46.
 Gilman, Herbert L., 416.
 Glover, George H., 317, 767.
 Graham, Robert, 76.
 Hadley, F. B., 26, 600.
 Hadwen, S., 724.
 Hall, Maurice C., 583.
 Hayes, F. M., 435.
 Healy, D. J., 291.
 Henley, R. R., 717.
 Hollingworth, W. G., 610.
 Hopper, Earle B., 738.
 Hoskins, H. Preston, 453.
 Jakeman, H. W., 702.
 Jardine, Ernest F., 328.
 Jones, F. S., 271.
 Jorgenson, G. E., 93.
 Kingman, H. E., 165.
 Lockett, S., 186.
 Lowe, William Herbert, 80.
 Lumb, J. W., 206.
 McEachran, Duncan, 761.
 McNair, F. H., 170.
 Moore, Veranus Alva, 625.
 Motley, A. A., 63.
 Munce, T. E., 402, 734.
 Munce, T. W., 702.
 Newsom, I. E., 562.
 Nighbert, E. M., 205.
 Noback, Charles V., 322, 325.
 Perry, Frederic M., 648.
 Peter, A. M., 291.
 Phipps, H., 435.
 Piper, H. B., 600.
 Quinlan, J. C., 781.
 Ratigan, W. J., 96, 639.
 Records, Edward, 155.
 Reed, R. C., 691.
 Roberts, G. A., 177.
 Santa Maria, L., 306.
 Schroeder, E. C., 542.
 Schwarzkopf, Olaf, 382.
 Sisson, S., 736.
 Smith, H. R., 310.
 Stubbs, E. L., 83, 461.
 Torrance, Frederick, 22.
 Townsend, J. G., 606.
 Traum, J., 186.
 Troy, O. E., 299.
 Turner, John P., 640.
 Vawter, Lyman R., 155.
 White, David S., 9.

Index of Subjects

Papers:

Abortion, Bovine Infections, Bureau of Animal Industry Investigations, 542.
 Abortion, Immunizing Cattle, 26.
 Abortion, Swine, 435.
 Address of President David S. White, 9.
 Animal Diseases, Importance of Preventive Measures, 402.
 Army Horses and Army Remount Service, 648.
 Bacillus Bovisepticus, Types in Dairy Herd, 271.
 Bacillus Ovissepticus Vaccines, Investigations, 562.
 Botulism in Relation to Anti-Hog-Cholera Serum and Hog-Cholera Virus, 702.
 Botulism in Swine in Relation to Hog-Cholera Immunization, 76.
 Chicken-Pox Vaccine, Experiment to Determine Value, 83.
 Clarification of Hog-Cholera Defibrinated Blood Antitoxin, 717.
 Colorado Veterinary Hospital, New, Dedication, 767.
 Cooperation Between United States and Mexico for Control of Epizootics, 306.
 Corpus Luteum, Relation to Estrum and Involution of the Pathologic Uterus, 34.
 Cuba, Fifth Medical Congress, 771.
 Digestive Tract, Diseases, Dogs and Cats, 170.
 Garbage Feeding and Hog Cholera, 22.
 Genital Infections in Bull, 416.
 Health Departments Interested in Tuberculosis Eradication, 683.
 Hemorrhagic Septicemia Organism, Virulent and Non-virulent Strains in Same Animal, 453.
 Herd Efficiency from Standpoint of Veterinarian, 738.
 Hog Cholera, 691.
 Hog Cholera and Garbage Feeding, 22.
 Hog-Cholera Defibrinated—Blood Antitoxin, Clarification, 717.
 Hog-Cholera Immunization and Botulism, 76.
 Hog-Cholera Serum and Virus, Botulism in Relation to, 702.
 Horse Semen, Hydrogen—Ion Concentration, 291.
 Hoskins, W. Horace, Tribute to, 80.
 Hypoderma Larvae, Effects of Improper Methods of Extracting, 724.
 Ictero-Hemoglobinuria in Cattle, 155.
 Laboratory Diagnosis of Poultry Diseases, 729.
 Laryngoplegia of Horse, Surgical Treatment, 141.
 Livestock, Purebred, Veterinarian and, 194.
 Livestock Shipping Losses, Prevention, 615.
 Loco Poisoning, Field Observations, 299.
 McEachran, Dean, Tribute on Behalf of McGill Veterinary Graduates, 756.
 McEachran, Duncan, and McGill Faculty of Comparative Medicine, 625.
 McGill Veterinary Reunion, Address, 761.
 Mexico and United States, Cooperation for Control of Epizootics, 306.
 Morgan Horse, Occurrence of Five Lumbar Vertebrae, 379.

Municipal Food Inspection, 317.
 Parasitic Diseases, Treatment and Prophylaxis, 583.
 Parturient Paresis of Dairy Cow, 63, 200.
 Poultry Diseases, Clinical Aids in Diagnosis, 283.
 Poultry Diseases, Laboratory Diagnosis, 729.
 Rinderpest in Brazil, 177.
 Sex Determination and Embryology of Uterus, 46.
 Strongylidosis in the Horse, 67.
 Surgical Operations on the Ox, 51.
 Surgical Technique—Suturing, 165.
 Tuberculosis, Bovine, Control, 186.
 Tuberculosis Eradication, Bovine, Progress in Montana, 59.
 Tuberculosis Eradication, Cooperation, 310.
 Tuberculosis Eradication, Health Departments Interested, 683.
 Tuberculosis in Shetland Pony, 600.
 Tuberculosis, Obscure Lesions, 191.
 Tuberculin Test, Ophthalmic, Pennsylvania Instructions, 734.
 Veterinarian and Public, 315.
 Veterinarian and Purebred Livestock, 194.
 Veterinarian, Practicing, and Accredited Herd Work, 606.
 Veterinarian, Relation to Humane Work, 610.
 Viscera of the Cow, 736.

Clinical and Case Reports:

Ankylosis, Congenital, in Calf, 782.
 Anthrax in Dogs, 322.
 Blackleg, Breed and Sex Susceptibility of Calves, 206.
 Capillaria Worms, Pathogenic Effects on Chickens, 461.
 Chorea in Dogs and Monkey, 639.
 Granuloma of Frog in Horse, 328.
 Intussusception in Colt, 329.
 Oleander Poisoning in Bear, 96.
 Parasites of Sheep on Sabana of Bogota (Colombia), 325.
 Pericarditis, Traumatic, 208.
 Pyosalpingitis, Surgical Treatment, 93.
 Rupture of Uterus in Cows, 640.
 Swine Erysipelas, 781.
 Udders, Indurated, in Virgin Heifers, 205.

Abstracts:

Abortion, Infectious, in Mares, 464.
 Anesthesia, General, in Horse by Intravenous Injection of Chloral Hydrate, 784.
 Anthrax, Diagnosis from Bone Marrow, 335.
 Antitoxins, Effect of Filtration on Potency, 102.
 Azoturia, Treatment with Animal Charcoal, 216.
 Bacillus Botulinus, Purity of American Strains, 213.
 Bacteria, Method for Determination of Number in Suspensions, 330.
 Beef Souring, Caused by Bacillus Megatherium, 214.
 Bipolar Infection in Animals, 785.
 Blackleg Immunization with Germ-free Filtrates, 465.

Botryomycosis, So-Called, in Man, 463.
 Calcium and Tuberculosis in Rabbits, 214.
 Cancer of Stomach in Horse, 334.
 Chaulmoogra Oil in Treatment of Tuberculosis and Leprosy, 335, 336.
 Cold, Action on Body, 466.
 Distemper in Pig, 215.
 Foot-and-Mouth Disease, Immunization, 334.
 Foot-and-Mouth Disease in Switzerland, 210.
 Fowl Typhoid, Epizootic in France, 465.
 Gangrenous Infections, Acute, Etiology, 212.
 Immunization, Nonspecific, Basis, 612.
 India Department of Veterinary Science, Report, 333.
 Johne's Disease, Transmission to Experimental Animals, 784.
 Lumbago, Treatment with Animal Charcoal, 216.
 Meat of Healthy Animals Free from Bacteria, 786.
 Oestrin in Pernicious Anemia of Horses, 783.
 Otitis Externa Parasitica of Cat, 211.
 Paralysis, Lumbar, of Sheep, 344.
 Paratuberculosis (Johne's Disease), 781.
 Paratyphoid of Honey Bee, 98.
 Pneumonia, Necrotizing, in Swine Plague and Hog Cholera, 466.
 Septicemic Infection in Lambs Caused by Swine Erysipelas Bacillus, 99.
 Stains, Polar, Preparation, 211.
 Strangles, Vaccination, 98.
 Suprarenin in Horse, 783.
 Swine Erysipelas and Erysipeloid (in Man), 645.
 Tonsils as Part of Entry for Infections, 210.
 Tubercle Bacilli, Avian, in White Rat, 612.
 Tubercle Bacilli in Bile, 100.
 Tuberculin, Diagnostic, 644.
 Tuberculin, Diagnostic Value in Human Surgical Tuberculosis, 101.
 Tuberculosis, Bovine, Complement Fixation, 99.
 Tuberculosis, Chaulmoogra Oil in Treatment, 335, 336.
 Tuberculosis, Friedmann Treatment, 101.
 Tuberculosis Immunizing Vaccine, 463.
 Tuberculosis in Small Rodents, 100.

Army Veterinary Service:
 Army Veterinary Picnic, 219.
 Army Horses and Army Remount Service, 648.
 Percheron as Army Horse, 467.
 Regulations for Officers' Reserve Corps, 341.
 Surgeon General Ireland, Letter, 340.
 Veterinary Corps, Examination for Appointment, 103, 218.

Association News:
American Veterinary Medical Association
 Denver Doings, 239.
 Notes, 372, 508, 669, 802.
 Resident Secretaries, 667.
 Women's Auxiliary, 241.

Proceedings of Fifty-Eighth Annual Meeting
 Amendment to By-Laws, 369.
 Election of Officers, 350.
 Place of Next Meeting, 370, 493.
 Proceedings, 220, 349, 471, 657, 787.
 Report of Auditing Committee, 470.

Report of Budget Committee, 502.
 Report of Committee on Abortion, 235.
 Report of Committee on Anatomical Nomenclature, 503.
 Report of Committee on Bovine Tuberculosis, 363.
 Report of Committee on Emblem, 500.
 Report of Committee on History, 231.
 Report of Committee on Intelligence and Education, 475.
 Report of Committee on International Veterinary Conference, 237.
 Report of Committee on Legislation, 337.
 Report of Committee on Necrology, 337.
 Report of Committee on Resolutions, 503.
 Report of Editor, 787.
 Report of Executive Board, 223, 349, 471, 492, 500.
 Report of Representative on Advisory Board of Horse Association of America, 354.
 Report of Secretary, 228.
 Report of Treasurer, 231, 790.
 Sections, Joint Meeting, 657.
 Section on Education and Research, 657.
 Section on General Practice, 657, 662.
 Section on Sanitary Science and Police, 657, 667.
 Section on Veterinary Colleges and Examining Boards, 666.
 Special Committee on Prevention and Control of Animal Diseases, 369.

Other Meetings
 Alabama Veterinary Medical Association, 670.
 British Columbia Veterinary Association, 320.
 California Board of Examiners, 375.
 California State Veterinary Medical Association, 376.
 California Veterinary Practitioners' Conference, 799.
 Central Michigan Veterinary Medical Society, 375, 325.
 Central Pennsylvania Veterinary Club, 230.
 Colorado Veterinary Medical Association, 325, 797.
 Conference of Research Workers in Animal Diseases, 519.
 Connecticut Veterinary Medical Association, 799.
 Georgia Veterinary Association, 246.
 Illinois Veterinary Medical Association, 323.
 International Conference on Epizootic Diseases of Domestic Animals (Paris), 124, 251.
 Kentucky Veterinary Medical Association, 110.
 Maine Veterinary Medical Association, 798.
 Manitoba Veterinary Association, 374.
 Maryland State Veterinary Medical Association, 114.
 Mississippi Delta Veterinary Association, 249.
 Mississippi State Veterinary Medical Association, 325.
 Missouri Valley Veterinary Association, 106, 326.
 Montana Veterinary Medical Association, 113.
 National Association of B. A. I. Veterinarians, Metropolitan Division, 322.
 New York State Veterinary Medical Society, 243.
 North Dakota Veterinary Medical Association, 111.

Oklahoma Veterinary Medical Association, 670.
 Ontario Veterinary Association, 118.
 Pennsylvania State Veterinary Medical Association, 377.
 Philadelphia Veterinary Club, 376, 524, 669.
 Quebec Veterinary Medical Association, 251.
 Schuylkill Valley Veterinary Medical Association, 524.
 Southeastern States Veterinary Medical Association, 524, 801.
 Tuberculosis Eradication Conference (Chicago), 253, 515.
 United States Livestock Sanitary Association, 510.
 University of Pennsylvania Conference of Veterinarians, 671.
 University of Pennsylvania Veterinary Alumni Dinner, 245.
 Western Michigan Veterinary Medical Association, 245.
 Western New York Veterinary Medical Association, 113, 378.
 Wisconsin Veterinary Medical Association, 800.
 World's Poultry Congress, 252.

Editorial:

Animal Experimentation, the Veterinarian and, 265.
 Antivivisection Antics, 268.
 Chiropractic, Veterinary, 142.
 Cuban-American Veterinary Entente Cordiale, 651.
 Denver Convention, 1.
 Diseases of Livestock on Wane, 679.
 Foot-and-Mouth Disease, Immunization, 139.
 Foot-and-Mouth Disease Sweeps Great Britain, 677.
 Old and New Year, 399.
 Opportunities for Veterinarians, 400.
 President, Our Newly Elected (A. T. Kinsley), 7.
 Press, Annual Meeting and, 268.
 Rabies, Reminder of Real Danger, 269.
 Students, Veterinary, Enrollment, 537.
 Students, Veterinary, Shortage, 143.
 Tuberculosis Work, Additional Funds, 401.
 Vaccine Therapy, Efficiency, 141.
 Veterinarian and Public Health, 538.

Book Reviews:

Diseases of the Small Domestic Animals, Oscar Victor Brumley, 646.
 Italian Veterinary Annual, 647.
 Laboratory Manual in General Microbiology, Ward Giltner, 216.
 Regional Anatomy of Domestic Animals, The Pig, E. Bourdelle, 337.

Communications:

Cuban Medical Congress, Invitation, 527.
 Ecuador, Letter, 256.
 Horses, Tractors and Trucks, 383.
 Mississippi, Exhibition in, 385.
 Morgan Horse, Five Lumbar Vertebrae, 379.
 low Fever, 674.
 Post-Card Advertising by Veterinary Supply Houses, 255.
 Protecting the Stock, 121.
 Purebred Stock, 529.
 Watch Out for "Dr. J. Hanigan," 255.

Necrology:

Albrechtsen, Jacob, 530.
 Archibald, R. A., 803.
 Armsby, Henry Prentiss, 530.
 Babcock, Charles H., 386.
 Barnes, F. E., 123.
 Edwards, W. C., 259.
 Gunn, Nelson T., 533.
 Harker, G. Frank, 123.
 Helmer, Jacob, 532.
 Jobson, George B., 672.
 Linn, Willard L., 673.
 Rectenwald, Mrs. N., 673.
 Robinson, Charles Barnwell, 672.
 White, S. W., 387.
 Winsloe, J. A. H., 673.

Miscellaneous:

American Legion Adopts Tuberculosis Resolution, 526.
 Animal Experimentation, the Doctor and the Dog, 91.
 Antituberculosis Vaccination, 282.
 Chiropractic, Veterinary, Again, 452.
 Food and Drug Law, Violations, 808.
 Government Scientific Periodicals Suspended, 676.
 Hassall, Albert, Honored, 760.
 Hookworm Treatment, 807.
 Horse Breeding, Move to Assist, 258.
 Horse for Street Cleaning, 21.
 Horses and Mules in War, 169.
 Horses, Endurance Test, 392.
 Horses Raise Cash, 534.
 Hoskins, Dean, Memorial Meeting, 805.
 International Congress on Comparative Pathology, 605.
 McEachran, Duncan, Honored Guest, 388.
 Morgan Horse, Famous, Honored, 261.
 Mountain Trip, 393.
 Rommel, George M., Resigns, 305.
 St. Kitts, Veterinary Practice in, 434.
 Salmon Memorial Fund, 259.
 South Dakota Laboratory Service, 671.
 Tapeworms in Dogs, Treatment, 396.
 Tuberculin Test by Area Plan, 395.
 Tuberculosis, German Savants on, 385.
 Tumors in Ethmoid Bones of Horses, 804.
 Veterinary and Human Medicine, Cooperation, 624.
 Williams, W. L., Compliment to, 339.
 Wood, Gen. Leonard, Fight Against Yellow fever, 674.

JOURNAL

OF THE

American Veterinary Medical Association

FORMERLY AMERICAN VETERINARY REVIEW

(Original Official Organ U. S. Vet. Med. Ass'n.)

J. R. MOHLER, Editor, Washington, D. C.

A. T. KINSLEY, President, Kansas City, Mo. N. S. MAYO, Secretary, Chicago, Ill.
M. JACOB, Treasurer, Knoxville, Tenn.

Executive Board

GEO. HILTON, 1st District; T. E. MUNCE, 2nd District; S. E. BENNETT, 3rd District;
J. A. KIERNAN, 4th District; C. E. COTTON, 5th District; R. A.
ARCHIBALD, 6th District

Sub-Committee on Journal

S. E. BENNETT J. A. KIERNAN

The American Veterinary Medical Association is not responsible for views or statements published in the JOURNAL, outside of its own authorized actions.
Reprints should be ordered in advance. Prices will be sent upon application.

VOL. LX, N. S. VOL. 13

OCTOBER, 1921

No. 1

THE DENVER CONVENTION

THE fifty-eighth annual convention of the American Veterinary Medical Association was called to order by President David S. White, in the Municipal Auditorium, Denver, on September 5, after an entertaining pipe-organ recital. The invocation was delivered by Rev. James E. Davis, pastor of the local Central Christian Church. The assemblage was officially welcomed to the city by the Hon. Dewey C. Bailey, Mayor of Denver, who related many interesting experiences of his fifty years in the cattle business, particularly those which he had with Texas fever in the early days when he trailed Texas cattle through Kansas and into Colorado. Colonel H. E. Bemis, of Ames, Iowa, responded happily and entertainingly to the mayor's address of welcome.

After several well-received vocal solos by H. W. Stanton, of Denver, President White delivered himself of a scholarly and well-prepared presidential address, outlining the work accomplished by the Association within the last year and predicting a steady growth for the future. This address will be found as the first paper in this issue.

The first business session of the convention was opened in the afternoon with the report of the Executive Board, followed by the election of new members, the reports of the

Secretary and of the Treasurer, and various reports of the different committees.

Monday evening the President's reception was held in the ball-room of the Albany Hotel, the headquarters of the convention. Dancing, with excellent music, followed until midnight, and many members availed themselves of this opportunity of rejuvenation.

SECTION PAPERS

On Tuesday morning the various sections of the Association met in joint session, beginning with an organ recital, and then proceeded with the reading of papers. Unfortunately many of those who were on the program failed to appear, but this was counteracted by the opportunity for more extended discussion of the papers of the authors present.

Dr. Jakeman, Chairman of the Section on Sanitary Science and Police, who presided at the combined meeting of the three sections, noted the need of familiarizing the public with the work of the veterinary profession. The fact is not appreciated that the livestock sanitary officer is a veterinarian. The veterinarian should be credited with his service in protecting human and animal health, in addition to being recognized as one who treats sick animals. Whenever possible he should cooperate with the medical man.

Dr. T. E. Munce stated that biological products are being used by veterinarians as a substitute for true prophylaxis, such as the primarily and fundamentally important sanitary measures. Prophylaxis is always possible to some extent, even without full knowledge of a disease, though this knowledge is needed for formulating the best prophylactic measures. The producer of food is a highly important factor in preventing animal diseases. Pennsylvania has a veterinarian devoting his time to disease prevention. The application of known measures will control most, if not all, of our transmissible diseases. Dr. Munce read a series of sixteen principles for disease control and recommended that a commission be appointed to study the subject of prophylaxis and report on it.

Drs. Records and Vawter presented a paper, read by the latter, on hemoglobinuria, and discussed the symptoms of the disease and reported the nature of the blood picture. There is a hemoglobinemia and a leucocytosis. The postmortem picture was given in detail. The bacteriological findings are of

especial interest. A number of bacterial forms may be isolated from various cases of the disease, but *Bacillus welchi* was the only one constantly found present wherever examination was made under suitable conditions, and is the only one with hemolytic properties. Administered by mouth to cattle, it was ineffective in producing the disease, but intramuscular injections produced a number of cases in cattle. Apparently there are some unknown contributing or predisposing factors in the disease, and it has a seasonal and regional incidence. Treatment was also discussed.

Dr. C. D. Marsh gave a general talk of an informal nature, illustrated by lantern slides showing poisonous plants and poisoned animals. He noted that whereas poisonous plants occur all over the United States, the losses in the West are much the more important, due to the conditions under which livestock is kept. Cattle are turned loose for months and drift over areas of poisonous plants, and sheep are handled by herders who occasionally herd them over dangerous areas through ignorance. Stock poisoning is usually the sequel to a scarcity of feed, poisonous plants not being eaten from choice as a rule. There are few remedies that are of use under range conditions. Dr. Marsh exhibited specimens of whorled milkweed, death camas, sneezeweed, rubber plant, high larkspur and aconite, and slides dealing with death camas, lupine, azalea, rubber plant, larkspur, sneezeweed, cherry and whorled milkweed.

Dr. Frederick Torrance's paper, which was read by Dr. Hilton, reported the results of Canadian measures for controlling the spread of hog cholera by garbage. The law prohibits the feeding of garbage away from the premises on which the garbage is produced, except under regulation and license. It is provided that such licensed persons must cook the garbage under suitable conditions and maintain a sanitary establishment. An outbreak of cholera is regarded as proof of violation of the law in the absence of evidence to the contrary. This law works well in controlling hog cholera. Since its passage, six years ago, 90 per cent of the outbreaks of hog cholera have been found to be due to violations of the law in regard to garbage feeding.

Dr. George H. Glover reported that there has been a greatly increased interest in the subject of municipal food inspection

among people in general if not among the veterinary profession. Such inspection is important in protecting the public health and therefore is more vital than streets, sidewalks, etc. Municipal inspection is feasible. The veterinarian must take an interest in this matter and other matters of public health. Dr. Glover gave a detailed account of the introduction of municipal inspection into Fort Collins, Colorado, noting the value of interesting the women's clubs in this matter.

Dr. Maurice C. Hall in his paper stated that we must take stock of our knowledge of treatments and preventive measures for the various parasitic diseases and adopt the most feasible and practical measures. In some cases we have good treatments and no practical prophylaxis. In other cases we have effective prophylaxis and no effective treatments yet known. Prophylaxis is often impractical in the control of such parasites as many of the nematodes of herbivores, where it is necessary to run these animals on pasture. The animals soil their feet with their feces and the parasites develop too rapidly to make pasture rotation at short intervals a practical control measure, owing to economic limitations. Under such conditions treatment is more practical and more important than any known prophylaxis.

Lack of time and space prevents the abstracting of the excellent addresses presented on the last two days of the meeting by Drs. S. Sisson, J. W. Adams, Fred M. Hayes, H. E. Kingman, O. E. Troy, R. H. Beaudette, F. H. McNair, Fred R. Jones, I. E. Newsom, D. J. Healy, Louis Santa Maria, W. J. Embree, George W. Stiles, Jr., and R. C. Reed, but they will be printed in the JOURNAL as speedily as possible.

ELECTION OF OFFICERS

The election of officers was the principal feature of the general session on Tuesday afternoon. Dr. Glover nominated Dr. A. T. Kinsley for President, while Dr. Eliason nominated Dr. T. H. Ferguson. When the ballots were counted Dr. Kinsley had 100 votes against Dr. Ferguson's 62, so the former was declared duly elected. Other officers elected were Charles G. Lamb, Denver, Colo., First Vice-President; J. F. McKenna, Fresno, Calif., Second Vice-President; W. H. Robinson, Portland, Me., Third Vice-President; W. A. Hilliard, Winnipeg, Canada, Fourth Vice-President; Hamlet Moore, New Orleans, La., Fifth

Vice-President; M. Jacob, Knoxville, Tenn., Treasurer. The Secretary and also the Editor succeed themselves.

The election of Dr. Kinsley to the presidency creates a vacancy on the Executive Board in the position of member at large. This vacancy may be filled temporarily by the incoming President, but the permanent member must be chosen by the ballots of the members present at the convention next year.

ENTERTAINMENT FEATURES

Tuesday evening banquets were held by alumni of the various colleges, as well as by the Shriners' Club and several other associations.

The one big feature of the meeting was the entertainment provided all day Wednesday by the 70-mile automobile drive through Denver's mountain park system, with a "beef-steak fry" at noon on Lookout Mountain, overlooking the town of Golden and adjacent to the last resting place of "Buffalo Bill," the Indian scout and buffalo hunter. The return was made by Bear Creek Canyon, one of the most famous scenic motor drives in the Rockies.

The wives and families of the delegates were given additional entertainment by an automobile trip through the city and surrounding sections on Thursday afternoon, and a card party Tuesday night. They were likewise present in large numbers at the general session Wednesday evening, when Prof. H. R. Smith, of Chicago, spoke on the subject of tuberculosis eradication and displayed the motion picture "Out of the Shadows," a film which shows the efforts being made to combat the spread of tuberculosis among cattle. Other films shown included the subjects of hog cholera control, tick eradication and Federal meat inspection.

THE LADIES' AUXILIARY

Members of the Ladies' Auxiliary of the Association met Tuesday afternoon at the Albany Hotel. After prayer by Mrs. C. E. Cotton, of Minneapolis, Mrs. G. H. Glover, of Fort Collins, welcomed the members to the city. The President's address was made by Mrs. A. T. Kinsley, of Kansas City, while Mrs. J. P. Turner, of Washington, D. C., who was unable to be present, sent an excellent paper which was read by the Secretary.

ELECTION OF SECTION OFFICERS

After the programs of the various sections of the Association had been completed the sections proceeded to the election of their officers, with the following result:

Section on General Practice—W. E. Muldoon, Chairman; H. E. Kingman, Secretary.

Section on Sanitary Science and Police—R. C. Reed, Chairman; H. Preston Hoskins, Secretary.

Section on Education and Research (formerly Section on College Faculties and Examining Boards)—C. P. Fitch, Chairman; L. W. Goss, Secretary.

PLACE OF NEXT MEETING

Through a real booster's talk by Mr. Hatfield, of the Chamber of Commerce of St. Louis, an invitation was extended to the Association to hold its next meeting at St. Louis, while both Drs. Eliason and Ferguson solicited the next meeting for Madison, Wis. At this session there happened to be only 86 members present, a slight majority of whom favored recommending to the Executive Board that the latter place be selected. However, the final selection will be left in abeyance until the next meeting of the Board in December.

ATTENDANCE AND MEMBERSHIP

During the convention there were 337 persons registered, of whom 217 were members of the Association. The number of new members elected at Denver was approximately 250, but this was not considered satisfactory, so a committee on new members was appointed, consisting of the President, the Chairman of the Executive Board, the Secretary and the Editor, to work out some definite plan for increasing our membership. Suggestions will be gladly received by this committee. Commissioner of Agriculture Whittlesey of Connecticut was the only honorary member elected this year.

Taken as a unit, the convention combined one of the most instructive and entertaining meetings ever held, and a large number of the delegates declared that from both an educational and a social point of view it was of vast benefit to them. The cool, bracing weather was also deeply appreciated, especially by those who came from sections of the country where the past summer's heat had been unusually intense.

OUR NEWLY ELECTED PRESIDENT

DR. ALBERT T. KINSLEY, who was elected President of the American Veterinary Medical Association for the ensuing year at the meeting held in Denver, Colorado, September 5 to 9, needs no introduction to the readers of *THE JOURNAL*. Through his connections with the Kansas State Agricultural College and the Kansas City Veterinary College, his activities in the interests of the veterinary profession and the veterinary organizations of which he is a member, his able addresses and liberal contributions to veterinary literature, his ability as a teacher, and his geniality, he enjoys a wide acquaintance among the members of the veterinary profession in this country and is recognized abroad as an authority on veterinary matters.

Dr. Kinsley was born of English parents at Independence, Iowa, February 26, 1877. His early education was obtained in the public schools of the State where he was born. In 1899 he graduated from the Kansas State Agricultural College with the degree of B. S. Throughout his collegiate course he displayed such marked aptitude that after graduating he was employed by the College as instructor in bacteriology. He remained at the College from 1899 to 1901, where, in connection with his duties as instructor, he continued his studies, and was awarded his M. S. degree in 1901. After leaving the Kansas College he took special work at the University of Chicago, after which he entered the Kansas City Veterinary College, graduating with the class of 1904. Immediately after graduation he accepted the chair of pathology and director of the museum in that college. In addition to teaching bacteriology and pathology from 1904 to 1918, he was President of the Kansas City Veterinary College from 1912 to 1918.

Dr. Kinsley has been an active member of the A. V. M. A. for many years and was honored with the vice-presidency in 1909-10. He is a member of the Missouri State Veterinary Medical Association and the Missouri Valley Veterinary Medical Association, and served as president of the latter in 1909-10.

In connection with his duties as an educator, Dr. Kinsley has written many valuable articles, including "Zinc Poisoning in Cattle," "Wound Healing," "The Significance of Pathology to the Practitioner," "Porcine Tuberculosis," "Ocular Epithelioma," "Epithelioma Contagiosum," "Equine Infectious Anemia," "A Disease in Chickens," "Cornstalk Disease," etc.



DR. A. T. KINSLEY

He is also the author of a work on "Veterinary Pathology" and another on "Diseases of Swine."

Dr. Kinsley is thoroughly fitted for the responsible position in the A. V. M. A. to which he has been elected. He has the backing of the organization, and THE JOURNAL wishes him a successful administration.

THE ADDRESS OF THE PRESIDENT

By DAVID S. WHITE

Columbus, Ohio

IT IS REQUIRED by our Constitution that the President deliver an address. This imposes an arduous but not unpleasant task. In the political world the President of a country or the Governor of a State delivers, on his installation into office, an inaugural address in which he sets forth, sometimes reiterating campaign pledges, his policies. This places him at a decided disadvantage, for before he can realize the many situations which will confront him and the many important decisions he must make, he is compelled to commit himself in advance. We have adopted the safer plan requiring that the President's address be delivered at the end of his term of office and after he has experienced a year of service. I do not know that the address is ever taken very seriously by the rank and file of the members. I think sometimes it is looked upon as a part of the perfunctory routine, and perhaps by a minority as the "swan song" of the incumbent.

To become president of an organization such as this I look upon as a great honor and one which should be conferred only upon a member who through the years has shown his devotion to the profession and to the Association by having given through them some service of benefit to mankind. In looking over the list of my predecessors in office, I believe this has been the aim and object of the membership. I therefore take this occasion to thank each and all of you for this honor. I have tried to accept it in the spirit in which it was given and to render what service I could to the cause for which we stand. If I have failed it is because I lacked in ability and not in inclination.

The term of office is too short for any given President to make an impress upon the organization. According to our Constitution he is elected for one year only and may never hope of reelection. In a democracy, such as our Association should be, this is probably a wise provision. But nevertheless the continuous

¹ Presented at the fifty-eighth annual meeting of the American Veterinary Medical Association, Denver, Colo., September 5-9, 1921.

administration of the affairs of the Association must be left to other officers whose terms are more permanent. While it is admitted that an absolute despotism is an ideal form of government, provided a good despot is available, the experience of the world has demonstrated it to be too risky to be adopted generally. Despots are always human and suffer from the frailties



DR. DAVID S. WHITE

Retiring President, American Veterinary Medical Association

of human nature, which frailties, as history shows, seemed to be intensified in some despots. Civilized humanity, therefore, has turned from absolute monarchy to constitutional monarchy, and from constitutional monarchy to democracy. While admittedly much has been surrendered to make these changes, the least of the evils seems to be a democratic form of government. I do not mean to advocate that either the term of office of your President be lengthened or his reelection be made possible. I do, however, wish to draw attention to the facts which in part explain the innocuous desuetude into which your President may seem to sink.

Fifty-eight years ago a small group of men, graduates of veterinary colleges, met together in an eastern city and founded this Association. They builded better than they knew. In those days veterinary medicine in this country was in a most primitive state. The value of livestock was low and what little veterinary service was required was furnished by the illiterate, self-trained empiric. In no State did laws exist governing the practice of our profession, and with the exception of two or three schools, each offering a most abbreviated curriculum and each dependent entirely upon student fees for its support, there were no opportunities to gain a veterinary education. State veterinary medicine did not exist. The only thing that lay before these far-seeing charter members was their faith in the future. During the half century which has followed some of them have lived to witness the changes which time has brought and to realize their aspirations and hopes. Today this Association is the largest veterinary organization in the world. Laws controlling the practice of the profession now exist in practically every State. The private veterinary school which sustained the profession during its formative years has given way to institutions of veterinary learning supported by the people. There have also developed National and State Bureaus of Animal Industry, which have as their function the control and eradication of animal disease, now carried on, for the most part, through well planned and directed organizations. The results have justified their existence. In connection with them veterinary research has been continuous and fruitful. Today no countries in the world enjoy greater freedom from animal plagues than do the Dominion of Canada and the United States.

One of our longest fought battles against disease was in the nineteenth century when contagious pleuropneumonia of cattle was conquered. One of our most successful campaigns was directed against foot-and-mouth disease, which had been an intermittent visitor since 1870.

In 1914 the most widespread outbreak in the history of the country occurred. Within three months the disease spread over twenty-one States and the District of Columbia. But notwithstanding the extraordinary communicability of the disease and the fact that the rank and file of the profession had had no previous experience with it, and that many people in authority, ignorant of its powers of devastation, opposed our measures of eradication as being too drastic, the disorder was finally compelled to desert our shores.

With Texas fever there has been a gratifying decrease in the geographical areas infested with the tick harboring the protozoön of this disease. If our well-directed efforts are continued we are justified in assuming that this cattle plague will cease to exist in this country. The importance of this work to the cattle raiser of the Southern States can not be overestimated. It has removed from him the handicap of a restricted market and permitted him to infuse into his herds the best blood.

Dourine, which for a time threatened horse breeding, has also been conquered. We now know how to control hog cholera.

The control and eradication of tuberculosis has resolved itself into a purely economic problem. The scientific facts underlying the mechanism of control are now well established. About the accredited herd plan I am optimistic. I believe it will eventually work out, especially since the cooperation of the layman has been secured. In this connection a certain amount of opposition has come from the veterinary practitioner, but I do not anticipate that this will continue when the organizations of official veterinarians have been functioning long enough to learn the part which they should rightly play in the game and the encroachments upon private practice become less obvious. Any scheme of disease control which ignores the reputable practitioner is faulty. On the other hand, experience has shown that unsupported individual effort, no matter how skilfully it may be applied, finds the restrictions imposed too great to accomplish the best results.

Once we secure the hearty cooperation of the State and National Governments, represented by official veterinarians, the veterinary practitioner and the layman, a successful program of disease control and eradication can be put into effect. Most of the difficulties which we as a profession meet in battling against animal disease are due to misunderstandings, ignorance and sometimes prejudice. However, as right must always prevail in the end, so may we expect that when hearty cooperation is obtained among the three groups mentioned, the difficulties will be removed and the chaos changed to cosmos. It takes time and energy to develop any piece of smooth-running machinery. The chief engineer of a company building the most expensive automotive vehicle in this country told me that it required six years "to get the 'niggers' out of the motor." It can not be expected, therefore, that in a few months a perfect mechanism of disease control can be designed and put into effectual operation. Disease control means war, and war of necessity makes it unpleasant for many people.

The past half century marks the formative period of the veterinary profession on this continent. The process of its development, like that of the other professions, has been evolutionary. It is still evolving. None of us will ever live to see it perfected.

This Association is the only mechanism we have to bring together the leaders of the profession in North America to exchange experiences, witness demonstrations and formulate policies. It has always been my desire to see this Association dominate veterinary policies and politics on this continent. That we have not to date fully accomplished these things has been largely due to our intense interest in mere technical details and the internal politics of the Association. These things are perfectly natural in an organization representing a profession still in its swaddling clothes. Fifty years is a long time in the life of an individual but is only a day in the development of a profession.

The future of this organization will depend upon the leadership of those elected to conduct its affairs. Our leaders must be men, therefore, of broad vision and not representative of only one of the various phases of professional activity. It would be a mistake to permit this Association to be dominated by the teacher interested only in teaching, the research man who sees

nothing beyond his narrow field, the vender of biological products imbued only with the spirit of commercialism, the official veterinarian who lays all stress on regulatory measures, or even the veterinary practitioner who cares for naught but the art of practice. Although we can not all be experts at teaching, research, commercialism, officials, or practitioners of veterinary art, we can be, every one of us, veterinarians. And of veterinarians only should this organization be made up. Therefore I am asking each group representing a phase of veterinary medicine to go over into the camps of the other groups, learn their problems, see what they are actually up against and endeavor to meet them half way in any act of cooperation which will contribute toward making us a united whole. As the President of the British Veterinary Association puts it: "No profession, however large, can be really powerful without unity; and in a small profession unity is one of the essentials of existence." We should strive, therefore, to forget our petty differences, trivial rivalries and little jealousies and become more tolerant of the opinions of our colleagues in order that complete unity of purpose and unity of action may be realized. For without these things we can not as a profession bring to bear our full strength, and without this we will not be able to attain our legitimate goal.

I can not emphasize too much the importance of unity. While admittedly we have made progress in this regard in the last half century, nevertheless I firmly believe it would have been more rapid and fruitful had we been more firmly united through the years which have passed. Our sister profession, the medical, has suffered from the same lack of unity as we. The tendency to split off into cliques and factions has been common to it. Lack of unity and hideboundness has injected into the medical profession various cults and sects which today are sapping the vitality of the physicians belonging to the so-called regular school. The difference of opinion among medical men in technical matters and the tendency for one physician to berate another has had its effect upon the laity. Those without the pale stand nonplused at the situation of the doctors continually disagreeing. Consequently when certain medical cults and sects ask of the laity modifications in the medical law, which gives to them a legal professional status, it is too often

granted. In our profession the situation in this regard is much less complex. But we also have our troubles and dissensions although not of the same kind. I think sometimes we are too apt to clique off into little, self-interested groups, each with its own leader and each at cross purposes with the other groups. A strong nation has never been built out of a conglomeration of disunited States, each an autonomous entity and independent of the rest. What would be our history as a nation today had the States Rights doctrine of the Confederacy won over the Nationalism of the Federacy during the Civil War? In place of a mighty republic, now the strongest on earth, we would find this continent occupied by a number of disintegrated sections, each with its own form of government and quarrelling with its neighbors. Firmly united the veterinary profession is already weak enough to fight the battles which it must fight in order to carry on its legitimate work.

Because of certain dissatisfactions, which may be in part justified, there seems to be a tendency among certain groups of veterinarians to abandon already established organizations and initiate ones of their own. This is deplorable. I do not believe that any group of veterinarians representing only one or two of the various phases of the profession can divorce themselves from the rest of us and go it independently. Practice, research, teaching, regulatory work and the military must be ever interwoven and overlapping. Among them there can be no marked line of cleavage drawn. They are interdependent. One can no more think of removing as a body from the American Veterinary Medical Association or from any State organization a group of veterinarians representing a phase of professional work and expect the mechanism to function any more than one could hope to see a motor car operate from which the transmission had been removed. We must remember the danger of a Mexican political policy, a scheme of self determination run riot, a crippling affliction which hurts all of us and in the long run does none of us any good.

I have therefore taken as my theme for this message the doctrine of unity. I have done so in the hope that this acorn of desire and appeal would fall upon fallow ground, where, nourished by the soil of harmony and watered by the rain of cooperation, it would sprout and grow and develop into a mighty oak

whose branches would reach upward to protect against the sun of rancor and discord, and whose every part, even to the smallest twig, would be a component of a beautifully organized whole able to resist the storms of summer and the tempests of winter. Whether it stand in the forest or in the open it represents not only a thing of beauty but also an object of usefulness.

To each of the following items I beg leave to briefly draw your attention:

Schools.—The greatest need of the profession today, in my opinion, is men with education and the ability of leadership. While I believe we possess a few of this type, as yet not enough have joined our ranks to stabilize our efforts. Our recruiting station is the veterinary school. According to the discipline of the profession each member must be first a graduate of an accredited college. Due to influences, some of them emanating from our own ranks, the student population of our schools has suffered a material reduction, especially in the past five years. The following table shows the number of students matriculated in each of the State veterinary schools and the single accredited private school in November, 1920:

Alabama Polytechnic Institute	53
Colorado Agricultural College	88
Georgia State Agricultural College	21
Iowa State Agricultural College	94
Kansas State Agricultural College	61
Michigan Agricultural College	21
New York State Veterinary College (Cornell)	78
New York State Veterinary College (New York University)	23
Ohio State University	106
Ontario Veterinary College (Toronto, Canada)	95
University of Pennsylvania	30
Texas Agricultural and Mechanical College	18
State College of Washington	22
Indiana Veterinary College	136
Total	846

It would seem passing strange that in a country of one hundred and ten millions of people, with livestock valued at close to ten billions of dollars, only eight hundred and forty-six young men desire to pursue a course in veterinary medicine.

There has been a tendency to increase the number of veterinary schools supported by the people. As a matter of State pride individual commonwealths have seriously considered the establishment of such institutions. It would be unfortunate

should the number of veterinary schools increase until there came from the people a greater demand for this type of education. While there was an excuse for the maintenance of a *private* veterinary school of mediocre caliber, there can be no reason for the existence of a *State* veterinary college which is in teaching staff, housing and facilities not in keeping with the increasing demands of animal husbandry. As practically all State-supported schools will be located at land-grant colleges, those having but few students will receive of the legislative appropriations granted the institution but a scant share. Medical education is an expensive thing. The cost of turning out a well trained medical man greatly exceeds that of producing a man of law, divinity, engineering or agriculture. When the distribution of the funds of an institution is on the basis of "the greatest good to the greatest number," obviously a poorly attended veterinary department will suffer financially. It would be far wiser if those States ambitious to support a school of veterinary medicine would give only the first two years of the curriculum and in a tangible way assist the student who wishes to complete the course at an already well established veterinary school. This device would not only be more economical for the initial State but would tend to make the best schools more populous in student numbers and better endowed by the States in which they are located.

I believe it is the duty of every veterinarian to encourage rather than discourage, as some are doing, young men of the right type to enter the profession. The emoluments of the profession are today greater for the expert than they ever were, but for the man of mediocre type they often do not offer sufficient remuneration to reimburse him for the time and money spent at school, and from now on they never will. There was a day when "any fool could farm." There was also a day when a man of no education, meager training and little or no dexterity in the art of veterinary practice could make a good living or at least a fairly easy livelihood. That day is gone.

The Army.—While the situation in the Army is very much better than it was prior to the great war, the Veterinary Service has not yet been given the authority to do its own job nor has it attained the stable status of the other staff corps. The Veterinary Corps has still at its head a medical officer, and I am in-

formed that veterinary officers in the field are under the immediate supervision of medical officers. Concerning both of these situations I think there exists in the profession a unanimity of opinion. That a veterinary officer should be at the head of the Veterinary Service of the United States Army there seems to be a general agreement. Leading veterinarians of the country, both military and civilian, seem to feel that the absence of such an arrangement places a decided stigma upon a profession which in civil life has been able to run its own show whenever it has been given the authority to do so. So much for the diagnosis. The treatment, however, does not seem so simple. The Veterinary Service of the Army up until after we entered the great war had been criminally neglected. The older veterinarians, who held the rank of a field officer, had never been given the opportunity to develop themselves as administrators. They were regimental officers, each the technical advisor of his commanding officer. The idea of an organized service had never been seriously considered even by many of the ranking veterinary officers. However, this is but a repetition of the history of the staff corps services in our Army, each of which attained its present status only after years of heroic endeavor. It must therefore be expected that the Veterinary Service must pass through practically the same evolutionary stages which other noncombatant services have passed through. Furthermore, a military establishment which remains too long at peace tends to degenerate into a state of conservatism rarely approached in civil life. This conservative mental attitude harbored by many officers of high rank and influence obviously make progress for the new-created veterinary service extremely difficult. The British Army, which gives to its veterinary officers greater authority than any army in existence, and which for this reason has been able to create the most efficient animal salvage corps the world has ever known, offers from a veterinary standpoint many advantages over our own. In the first place it made the veterinary service attractive to young men not only in rank and pay but in opportunity to see the world and some action, as this army is fighting somewhere nearly all the time. It took Great Britain, however, nearly half a century and two great wars to create its army veterinary service. It will probably require of us as long a time.

I have been in correspondence with Major General Ireland, Surgeon General of the Army, in regard to this matter, and have offered some suggestions which in time should work out to the benefit of the Veterinary Service. In my opinion General Ireland thoroughly understands the situation, is in sympathy with the veterinary officer and his problems, and will eventually be able to set the Veterinary Service on its feet. It would seem to me logical, inasmuch as no veterinary officer of sufficient rank is available to act as director, for the Surgeon General to select from among the veterinary officers one who with opportunity and experience would make an efficient director and who eventually could be placed at the head of the Veterinary Corps. If something of this sort is not done, I do not see how we can hope to develop a veterinary officer for this position. I do not believe any attempt has been made to do this thing but I do feel the present incumbent should have an understudy, a veterinary officer who could take his place when he is relieved. I have the highest regard for Colonel Morse. He is a good administrator, a broad-minded gentleman, and has proved an excellent "wet nurse" for the veterinary baby. However, it is to be hoped that this youngster will soon be weaned and taught to eat solid food.

In my opinion it will be some time before the Veterinary Corps can become a separate organization. To attempt to make it one at this time would be disastrous. For the present and until it has worked out its salvation and attained an undisputed status in the Army it should remain in the Medical Department. For many reasons it is better off there than it would be in any other department.

National Research Council.—Pursuant to the action of this body, a member of it, a veterinarian of national reputation in research and experiment, has been appointed a member of the National Research Council. I believe this to be a good thing. The more we mingle with scientific folk outside the profession the better will the profession be recognized and esteemed by these folk. Furthermore, many problems in medicine of direct interest and usefulness to the human being can be best worked out through cooperation with the properly equipped and trained veterinarian.

National Narcotic Law.—A communication has been received

from the National Committee, representing the professions of medicine, dentistry and pharmacy, at work drafting a new national narcotic law, requesting that this organization also be represented. It would seem fitting, therefore, for us to take action in order that our rights and privileges be looked after when this matter is being given consideration.

General Anesthesia Law.—The Blue Cross Society has requested that this Association use its good offices to create a sentiment which will lead eventually to the passage of State laws requiring that general anesthesia be employed in all major surgical operations upon animals. For practical reasons the castration of animals is excepted. A similar law has been enacted in England. Such legislation, it is thought by the Society, would, among other things, tend to limit the number of major surgical operations performed by empirics.

Permanent Secretary.—It has been voted to authorize the Executive Board to make the office of Secretary more permanent, probably combining with it the editorship and management of the JOURNAL of the Association. This matter has been given careful consideration by the Executive Board, whose report will give the results of their deliberations regarding it.

United States Meat Inspection Service.—Influences are at work to transfer the Meat Inspection Division of the Bureau of Animal Industry to a Department of Public Welfare. The transfer is urged on the grounds of economy and efficiency. As it looks at this distance, there lurks within the danger that national meat inspection would be taken out of the hands of the veterinarian and placed under the supervision of a physician. The transfer would also divorce from the Bureau its largest division and very probably would lead to expensive duplication in laboratory facilities and equipment. In the light of our present information, the step seems inadvisable both from the professional and lay standpoints. It is certainly the duty of this Association to investigate thoroughly this important matter, and to do so before the transfer is made, in order to be in a position to prevent it if it is to work injury to the profession. This is a national problem entirely within the province of this Association to consider.

It is hoped that you will enjoy a successful meeting both from the standpoints of acquiring information and at the same time

most healthful recreation. You are being entertained in America's great playground, the mountains of Colorado. You are among the biggest hearted, most whole souled and hospitable people in the world—the people of the Great West. I trust, therefore, you may not only gain from the literary programs arranged for you but may also enjoy yourselves to the utmost as guests of the profession of this great State.

THE HORSE FOR STREET CLEANING

Director Frank H. Caven of the Philadelphia Department of Public Works has advanced ideas on the subject of street cleaning and rubbish collection.

His plans for the erection of destructories for the odorless cremation of street refuse is evidence of this fact.

This is the electric age—the “Johnny-on-the-spot” era of efficiency.

It is the period when efficiency engineers flourish and by-products are the creators of greater wealth than the original article of production.

Notwithstanding this the experimental conclusion of the Director and his force of engineers is that it is greater economy to spend something like \$800,000 for trucks, wagons and horses with which to start a city-wide street-cleaning program than to put the same amount of money into costly gasoline trucks, dump carts and auto machinery.

A tremendous upkeep is the principal argument against motor vehicles in street cleaning.

With the construction of destructories long hauls necessitated by far-distant dumps will be eliminated. A team of horses for short hauls is more economical than the electric vehicle, at least at the present stage of development in street cleaning.

About 1,400 horses are required to keep the city streets clean. This includes teams for the collection of rubbish and garbage.

These horses are used to move 21 flushers, 57 trucks, 515 wagons, 100 machine brooms and 50 sprinklers.

If the Department of Public Works went into the auto ash collection scheme over 1,000 motor-driven vehicles would be required to keep the city clean.

GARBAGE FEEDING IN RELATION TO THE CONTROL OF HOG CHOLERA¹

By FREDERICK TORRANCE

Veterinary Director General, Canada

GARBAGE as a source of hog cholera had been under suspicion for some time previous to the year 1912, when Dr. C. D. McGilvray read a paper before this association on the subject. He gave particulars of several outbreaks in the Province of Manitoba, where every other source of possible infection could be excluded, and only garbage remained as the probable infective agent. The presence in the garbage of uncooked scraps of pork which might have come from hogs affected with incipient hog cholera was suggested by Dr. McGilvray as the cause.

The statement that hog cholera might be conveyed in this way was received with some incredulity at the time, but experience and experiment have confirmed the result which he reached by a logical inference.

The Health of Animals Branch of the Department of Agriculture, dealing with hog cholera as it made its appearance from time to time in various parts of Canada, accumulated a lot of evidence that garbage feeding was a very real source of danger and should be controlled if possible. A new regulation was therefore made and became law on April 27, 1915. It is as follows:

“The feeding of swine upon garbage or swill, either raw or cooked, obtained elsewhere than on the premises where fed, is prohibited, unless special permission in writing is first obtained from the Veterinary Director General.”

Feeders of garbage were notified to make application for a license and required to sign an agreement as follows:

“In consideration of the granting of a license to me, I hereby agree (1) to boil thoroughly all garbage before feeding it to swine, and to prevent my swine from having access to uncooked garbage; (2) to maintain my hogs in a clean, sanitary condition; (3) to sell no hogs except for immediate

¹Presented at the fifty-eighth annual meeting of the American Veterinary Medical Association, Denver, Colo., September 5-9, 1921.

slaughter; and (4) to notify the veterinary inspector without delay if sickness appears among my hogs."

On receipt of a signed application an inspector is detailed to visit and report on the premises, and no license is issued unless the premises are fairly such as can be kept clean and sanitary and are provided with the appliances necessary for cooking the garbage. For those keeping only a few pigs, up to twelve but not more, an ordinary food boiler was considered satisfactory. For owners having any number in excess of twelve we require a steam boiler and vats of sufficient capacity for the size of the herd.

Inspection of licensed garbage feeders is carried out by a staff of lay inspectors who visit the premises from time to time and report on the conditions as they find them.

If a report shows that a garbage feeder is neglecting to cook the garbage, or failing to boil it sufficiently, or is keeping his premises in a dirty, insanitary condition, he is given a warning, and if conditions are not made satisfactory at once his license is cancelled. The inspectors are constantly on the lookout for persons feeding garbage without license, and either warn them to procure a license without delay or else action is taken to have them brought before a magistrate and a fine imposed.

In case a lay inspector should find some hogs sick he immediately reports to a veterinary inspector, who visits the cases, makes a diagnosis and deals with the outbreak as circumstances require. If the disease is hog cholera, the affected hogs are slaughtered, the hogs in contact are serum treated and the premises placed under quarantine. The hogs on neighboring premises are visited and if deemed necessary by the inspector they too are serum treated and the premises quarantined.

In Canada we pay compensation for hogs slaughtered by order of an inspector for the control of a contagious disease. Compensation is limited to two-thirds of the valuation, which must not exceed \$20 for a grade or \$75 for a purebred pig. When hog cholera breaks out on a licensed garbage feeder's premises it is assumed that he has failed in his duty to cook the garbage properly or to prevent hogs from gaining access to it before it is cooked. Compensation is therefore with-

held unless it can be shown that the infection came from some other source than uncooked garbage.

This system has now been in operation for over five years and is found to work well. It has not altogether wiped out hog cholera, but it has enabled us to get early information of outbreaks and by dealing with them promptly to prevent their extension to adjoining premises. The frequent inspection and the insistence on sanitation have had a marked effect in improving the cleanliness and comfort of the swine kept on licensed premises and have helped to remove what was often a nuisance in the outskirts of a city.

A comparative statement of five years before and five years after this system was adopted will indicate the progress made. The first period is from April 1, 1909, to March 31, 1915; the second from April 1, 1915, to March 31, 1921:

	First period.	Second period.
Total number of outbreaks.....	1,426	742
Total number of swine slaughtered	42,663	19,709
Valuation of swine slaughtered.....	\$368,783.81	\$247,901.70
Compensation paid for swine slaughtered	245,455.72	141,545.43

It will be noticed that the number of outbreaks has been practically cut in half. Compensation would have been correspondingly reduced but that during the first period the maximum valuation was \$15 and \$50 as against \$20 and \$75. This increase was made in consequence of the claims of livestock owners that the higher market prices of cattle and hogs entitled them to a higher rate of compensation.

The improvement in the hog cholera situation since the licensing of garbage feeders was begun is better shown perhaps by the figures for each of the five years:

Year.	Outbreaks.	Number of hogs killed.	Com-pensation.
1916.....	290	5,700	\$33,699.95
1917.....	90	4,623	30,497.59
1918.....	62	2,212	13,031.20
1919.....	52	2,163	23,342.74
1920.....	92	1,642	19,001.71
1921 (4 months).....	5	81	198.00

In a country as large as Canada these results have not been attained without exciting opposition and sometimes active an-

tagonism. The class of persons engaged in this occupation is not noted for intelligence. Some of them are foreigners to whom our laws are strange. Our inspectors have sometimes been met with threats and even physical violence. We have persisted, however, and have not hesitated to invoke the law whenever less drastic methods failed. During the period covered by this paper we have instituted sixty-three prosecutions and secured fifty-nine convictions, chiefly for the offense of feeding collected garbage without a license.

A final word as to the connection between garbage feeding and hog cholera. We have records of 742 outbreaks of hog cholera of which all but 75 were attributable to this cause. In other words, 90 per cent of the hog cholera we have had in Canada during the past five years had its origin in the garbage pail.

Our system is working well. We now have 471 licensed garbage feeders and so far as I know not a single case of hog cholera in the whole of Canada.

JAPANESE RULES OF THE ROAD

(Promulgated in Tokio)

1. At the rise of the hand policeman stop rapidly.
2. Do not pass him by or otherwise disrespect him.
3. When a passenger of the foot hove in sight, tootle the horn trumpet at him, melodiously at first, but if he still obstacles your passage tootle him with vigour and express by word of mouth the warning, "Hi, Hi."
4. Beware the wandering horse that he shall not take fright as you pass him. Do not explode an exhaust box at him. Go soothingly by.
5. Give big space to the festive dog that shall sport in the roadway.
6. Avoid entanglement of dog with your wheel spokes.
7. Go soothingly on the grease as there lurk the skid demon.
8. Press the brake of the feet as you roll round the corners to save the collapse and tie-up.—*Journal of the American Medical Association.*

RESULTS FROM IMMUNIZING CATTLE AGAINST ABORTION¹

By F. B. HADLEY

University of Wisconsin, Madison

THE one question about bovine contagious abortion that livestock men and veterinarians are asking more often than any other today is in regard to methods of establishing immunity against the disease. Although there is yet much to be learned about the subject, it is certain that the experimental work which has been conducted to shed light on the practicability of establishing an artificial type of immunity has demonstrated the possibility of this means of control.

Since extensive, adequately controlled experiments have been conducted in England, Germany and Wisconsin with several different immunizing products, each of which has given somewhat different results in the hands of the various investigators, it should be interesting to compare the results, as the countries in which the work was done are widely separated. In this way it seems that the controversy that exists relative to the efficiency of these products as aids in preventing contagious abortion may, in a measure at least, be settled.

Three distinct biologic products have been employed in these experiments. These have been used alone as well as in various combinations. They are (1) a bacterin consisting of dead abortion bacilli; (2) a vaccine consisting of living abortion bacilli; (3) an immune serum produced by giving cows large and repeated doses of abortion bacilli, then bleeding them and recovering the blood serum.

It is significant that the product containing the dead abortion bacilli is recommended almost exclusively by commercial firms who are its chief exploiters. Some of these firms claim astonishing results from the use of abortion bacterin, but have no reliable data to substantiate the claim. Certain manufacturers go so far as to guarantee certain results from the use of their abortion bacterin. Claims of this kind must be great exaggerations, if results reported in this paper are authentic.

¹Presented at the fifty-eighth annual meeting of the American Veterinary Medical Association, Denver, Colo., September 5-9, 1921.

It is charitable to believe that the exaggerated claims have been based on the fact that bacterins have given such excellent results in typhoid fever of man, rather than upon their actual use in veterinary practice as an immunizing agent against contagious abortion.

The abortion vaccine has been used for creating immunity against abortion on the strength of favorable results secured from the use of a similar product in certain other infectious diseases of animals. Theoretically it should be capable of stimulating the production of abortion antibodies in sufficient amounts to prevent any abortion bacilli, that may subsequently gain entrance to the body, from producing disease.

The immune serum has been used alone to a limited extent only, as trials showed it to be of little value. It has been employed simultaneously with both the dead and living abortion bacilli; also to sensitize the live organisms for the purpose of preparing the as yet little used products known as abortion serovaccine and serobaeterin.

In Table 1 is given a summary of the results of an investigation conducted by veterinarians for the Board of Agriculture of England in an attempt to prove or disprove the value of two of the products under discussion. The herds presented had all experienced severe losses from abortion just prior to treatment.

TABLE 1.—RESULTS OF IMMUNIZING CATTLE AGAINST ABORTION IN ENGLAND

Method of conferring immunity	Total number of animals	Less those which died, were barren or were sold	Number aborted	Per cent aborted	Number calved ^a correctly	Per cent calved correctly
Immunized with live bacilli.....	594	594-101=493	132	6.5	461	93.5
Controls not immunized.....	472	472-40=432	101	23.4	331	76.6
Immunized with dead bacilli....	146	146-36=110	23	21.0	87	79.0

The following conclusions seem justified from the data presented in Table 1: (1) That immunization with live abortion bacilli (vaccination) resulted in conferring immunity on 93.5 per cent of the cattle treated in herds where over 30 per cent of them aborted before the experiments began. (2) That over 23 per cent of the untreated controls aborted. (3) That treatment with the dead bacilli conferred little if any immunity, for the percentage of abortions in this group was practically the same as in the group left as controls. This means that al-

though the abortion bacterin caused little or no harm, it did not prevent the occurrence of abortion with any degree of regularity or to any extent.

The men in charge of this series of experiments came to the conclusion that: (1) It is necessary to continue the inoculations for a time on infected premises after abortions cease to occur; (2) inoculations should be carried out in an infected herd until abortion has ceased, but if the herd is one which is restocked by buying in fresh non-pregnant animals, these animals should always be inoculated; (3) if pregnant animals are bought, they may reintroduce infection; (4) although very few animals which have been immunized for one pregnancy have aborted at subsequent pregnancies, it appears that if an animal is immunized for two pregnancies running, there is very little chance of the animal aborting afterwards.

German investigators have also conducted immunization experiments against contagious abortion on a relatively large scale. The results of this work are detailed in the *Arbiter aus dem Reichsgesundheitsamte*, 52 Band, Heft 3, in the following manner:

TABLE 2.—RESULTS OF IMMUNIZING CATTLE AGAINST ABORTION IN GERMANY

Immunizing material employed	Number treated	Number aborted after treatment	Per cent aborted	Per cent calved normally
Dead bacilli	937	117	12.5	87.5
Dead bacilli plus immune serum	157	20	12.7	87.3
Live bacilli	482	28	5.8	94.2
Live bacilli plus immune serum	57	3	5.3	94.7
Immune serum	17	9	53.0	47.0
Controls not immunized	1,356	245	18.1	51.9

The conclusions arrived at by the German investigators from the results of their observations were as follows: (1) The dead bacilli in both non-pregnant and pregnant cows produced some degree of immunity; it was, however, of low degree and of short duration. Many cows did not abort at the first calving after this method of treatment, but did at the second. (2) The dead bacilli when injected with immune serum gave results similar to those obtained from the use of the dead bacilli alone, and lead to the conclusion that both are of little use. (3) The live bacilli gave better results in all circumstances than the dead. Of 128 cows, which had previously aborted, treated with live bacilli, only six aborted afterwards. Better results were also obtained in preventing abortion in cows that

had never aborted yet were in herds with infected cattle. (4) The live bacilli plus the immune serum gave about the same protection as the live bacilli alone. This method also proved helpful in preventing abortion in pregnant cows, reducing the losses among them as did the live bacilli alone in non-pregnant cows. (5) The immune serum alone was found to be practically worthless. (6) The controls were injected with plain broth which gave no protection; in fact, there were more abortions in this group of cows after treatment than before.

It was observed that widely varying results occurred in different herds. For example, in some herds abortion disappeared completely; in others there was a decrease; in still others there seemed to be no change either way; while in a few herds there was an actual increase. As a result of all the methods of immunization taken together, there was a net decrease in abortion.

During the two-year period between January 1, 1919, and December 31, 1920, the Department of Veterinary Science of the University of Wisconsin prepared and distributed through veterinarians in Wisconsin nearly 1,000 doses of this vaccine. At the time this is written reports have been received on 474 vaccinated cattle and 101 controls in 42 different herds. These cattle were kept under ordinary farm conditions, so the criticism that the animals and their quarters were not typical can not be made. The vaccine used in this Wisconsin experiment was prepared very carefully to insure a uniform, uncontaminated and fresh product.

In order to find out how cattle of different ages and classes respond to the vaccine treatment, the animals were classified or divided into the various groups shown in Table 3. So far as was possible some animals in each herd were left unvaccinated as controls. It should be understood in studying these data that the disease was present in the majority of the herds here represented and had caused heavy losses in some of them, but it is not possible to give either the herd or the individual history. The average abortion rate in these herds previous to treatment was not determined. The controls had an average abortion rate of 31.2 per cent during the two-year period mentioned. A considerable number of the virgin

TABLE 3.—RESULTS OF VACCINATING CATTLE AGAINST ABORTION IN WISCONSIN
(The 12 herds here represented were under observation from January 1, 1919, to
December 31, 1920.)

Description of animals	Total number of animals	Less those barren, sold, died	Number aborted	Per cent aborted	Number calved normally	Per cent calved normally
Unbred heifers vaccinated	136	136 - 9 = 127	28 *	22.1	95	77.9
Unbred heifers left unvaccinated as controls.....	26	26 - 2 = 24	8	33.3	16	66.7
Open cows that have not aborted, vaccinated.....	221	221 - 14 = 207	17	8.2	190	91.8
Open cows that have not aborted, left unvaccinated as controls.....	21	21 - 3 = 18	10	55.6	8	44.4
Open cows that have aborted, vaccinated.....	73	73 - 3 = 70	11	15.7	59	84.3
Open cows that have aborted, left unvaccinated as controls.....	25	25 - 1 = 24	1	16.7	20	33.3
Closed cows that have not aborted, vaccinated.....	13	13 - 2 = 11	3	27.3	8	72.7
Closed cows that have not aborted, left unvaccinated as controls.....	26	26 - 4 = 22	5	22.7	17	77.3
Closed cows that have aborted, vaccinated.....	31	31 - 7 = 24	3	12.0	21	84.0
Closed cows that have aborted, left unvaccinated as controls.....	3	3 - 1 = 2	1	50.0	1	50.0
Entire number vaccinated	474	474 - 35 = 439	62	14.1	397	85.9
Entire number of controls	101	101 - 11 = 90	28	31.2	62	68.8

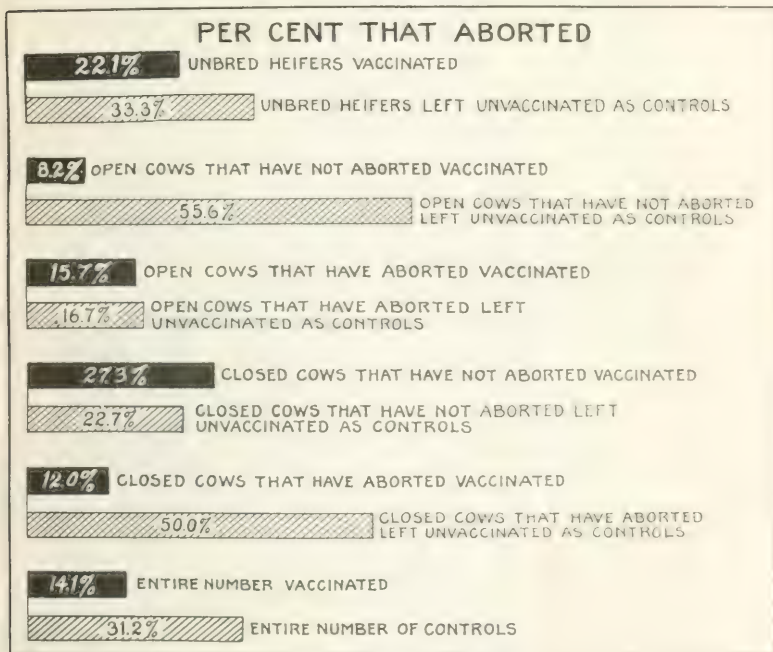
heifers had never been exposed to infection before being vaccinated.

Analysis of the figures given in Table 3 shows that out of 127 unbred heifers that were vaccinated previous to conception 77.9 per cent calved normally, while only 66.7 per cent of the controls did. In other words, the abortion rate in the controls was 33.3 per cent, which is very high and shows that the infection which existed in the herds was virulent. These results from the use of the vaccine in heifers were not so satisfactory as we had anticipated for this age group before tabulating our data, but they do demonstrate that the vaccine has immunizing value for heifers. The figures support the well-known belief that heifers are more susceptible to the abortion disease than are mature cows. They do not coincide with the opinion of the German workers that age has no bearing either on susceptibility to the disease or to immunization, provided that the animals are sexually mature.

The most gratifying results were obtained with open cows that had never aborted. In this group the vaccine was 91.8 per cent effective, which is in marked contrast to 44.4 per

cent of normal calvings for the controls. This indicates that the vaccine has its greatest value for open cows in herds where the epizootic is known to exist.

The vaccine had little value when administered to open cows that had aborted. In this group the percentage of cows that calved normally was nearly the same as in the case of controls. This is just what one would expect when the fact is taken into consideration that some immunity is conferred as a result of a naturally acquired infection.



Comparison of Abortion in Vaccinated and Unvaccinated Cattle in Wisconsin Experiments. (See Table 3 for Details.)

As would be surmised, a higher percentage of the cows that were pregnant at the time of vaccination and that had never aborted did abort subsequently than did the controls that were not vaccinated. The difference, however, was not marked.

Of the cows that had aborted and that were pregnant at time of treatment, the figures show that the percentage of normal calvings was nearly the same as in aborters that were vaccinated before being bred. The number of controls in this group is so small that no conclusions can be drawn from them.

Altogether 474 cows and heifers were vaccinated. Of these 439 were available for data, the others having failed to breed, been sold or died. Only 14.1 per cent of these aborted, while of the 101 controls that were not treated 31.2 per cent aborted. When these figures are compared it is seen that the abortion rate was twice as great in the controls as in the vaccinated animals.

The writer believes that these Wisconsin experiments warrant the conclusion that the abortion vaccine has a decided immunizing value, especially for cattle of certain groups. The vaccinated cattle showed a decrease in both the abortion rate and the sterility rate. As a result there was an increase in the breeding efficiency of the treated over the untreated animals. This was particularly marked in the second gestation period. In some herds no abortions occurred subsequent to the treatment; in others the abortion rate was not changed; in a very few the treatment actually seemed to be a detriment. The sequelae of contagious abortion infection in many herds were favorably influenced; for example, in some herds, where repeated services had been necessary before conception occurred, the cows after inoculation promptly conceived; there was also less trouble reported from retained placenta.

Let us now compare the results secured in England, Germany and Wisconsin from the use of the dead abortion bacilli, or that product known commercially as abortion bacterin. In England it was found to be of no value whatsoever; in Germany it produced some degree of immunity, but the protection was of short duration, and not substantial enough to be depended upon; in Wisconsin this product was used in a series of experiments, not reported in this paper, in which it was found to have absolutely no immunizing value. These data warrant the conclusion that under both farm and experimental conditions abortion bacterin has failed.

By comparing the results from the use of the live abortion bacilli as shown in Tables 1, 2 and 3 it is seen that this product was 93.5 per cent effective in preventing abortion in England, 94.2 per cent effective in Germany and 85.9 per cent in Wisconsin. This is an average of 91.2 per cent, which is very gratifying. In England 23.4 per cent of the control animals aborted, 18.1 per cent in Germany and 31.2 per cent

in Wisconsin, which makes a general average of 24.2 per cent. The difference in results may be accounted for by the difference in virulence of the infection, which apparently was most pronounced in Wisconsin, considerably less pronounced in England, and markedly less in Germany, as fewer untreated controls aborted in the latter two countries and a smaller percentage of abortions occurred among the vaccinated animals in these foreign countries than Wisconsin. The possibility also exists that the Wisconsin cattle were more susceptible to infection.

In closing, the writer wishes to warn against the dangers of passing premature judgment on the value of any therapeutic agent for contagious abortion. One should guard himself against excessive optimism based on the results of limited trials, for this might be a means of confusing the issue. Therefore the results reported in this paper should be taken with the same degree of conservatism in which they are given. In view, however, that success was achieved in such a large number of animals on which the statistical records are complete, the idea of attributing the results to spontaneous cure may be dismissed.

A shipment of 3,000 reindeer carcasses, to be sent to all parts of the United States, including the Atlantic seaboard, was due to arrive in Seattle from Nome September 1. Five thousand reindeer are available for meat, but transportation facilities will permit only 3,000 to be shipped. The surplus young male reindeer are now being culled out preparatory to slaughtering and shipping. All fresh meat will be stored in the refrigerators of the Seattle Port Commission until redistributed.

One of the startling conclusions to be drawn from poultry culling work in Iowa the present season is the widespread prevalence of disease found in farm flocks by the investigators. Some reports show that as high as 75 per cent of the flocks in some counties are found to be tuberculous. The general results found are indicative of the fact that disease is much more prevalent than it was last year.—*Iowa Homestead*.

THE RELATION OF THE CORPUS LUTEUM TO ESTRUM AND INVOLUTION OF THE PATHOLOGIC UTERUS¹

By W. L. BOYD

University Farm, St. Paul, Minn.

IN discussing the corpus luteum the writer thought it advisable to give a brief discussion of the histology and physiology of this endocrine gland.

The corpus luteum or yellow body is a gland of internal secretion and originates or develops from the mature Graafian follicle following its rupture. Immediately beneath the modified mesothelial covering of the ovary is the germinal epithelium. The germinal epithelium proliferates actively, as do also the primordial ova, and is said to dip or extend down into the stroma, carrying with it the ova. These groups of cells are called Pflüger's tubes. The connective tissue surrounding these columns of epithelial cells develops in such a manner that masses of germinal epithelium containing one or more primordial ova are split off, until finally the ovary is formed entirely of primary follicles and connective tissue stroma.

The Graafian follicles, which were first described by Rene de Graaf and named after him, are found in three different stages: primary, growing and maturing follicles. As the follicle or ovisac approaches maturity, it is then located near the surface, where it finally projects to the exterior in the form of a vesicle. When the follicle is fully matured the fibers of the theca separate, necrosis results, and the follicle ruptures at this point, which is known as the stigma. The rupture of the ripe ovisac with the discharge of the ripe ovum constitutes the act of ovulation.

The wound, if one may be permitted to call it such, which results from ovulation, rapidly fills with blood, forming what is known as the corpus hemorrhagicum. This body is soon replaced by large epithelial cells, which, according to Novak,

¹ Presented at the twenty-third semi-annual meeting of the Minnesota State Veterinary Medical Association, Hutchinson, Minn., July 14 and 15, 1921. Published with Journal Series No. 268.

originate from the stratum granulosum. These cells contain a yellowish brown pigment first called lutein, but now according to Escher is known to be carotin, a substance identical with the pigment of carrots. This pigment is very pronounced in the cow. The corpus luteum of the mare, ewe and sow is not so highly colored, and according to Palmer carotin is not present in the lutein cells of the sow.

The corpus luteum of pregnancy develops to about the size of a marble or an acorn and occupies almost the entire part of the ovary, being surrounded by a network of capillaries. The arrangement of the cells approximates the placement of the cells in the cortical region of the suprarenal gland. The false corpus luteum does not grow to any great size and as a rule practically disappears within twenty to thirty days. The histological appearance of both true and false corpora lutea is probably identical.

THE FUNCTION OF THE CORPUS LUTEUM

To Gustav Born of Breslau belongs the credit of being first to suggest that the corpus luteum is a ductless gland producing a secretion which prepares the endometrium for the attachment of the fertilized ovum. Frankel's researches on this subject have been extensive and his general conclusions are as follows:

The corpus luteum is a ductless gland which is renewed every four weeks during reproductive life in the human female and at different intervals in the various mammals. . . . Its function is to control the function of the uterus from puberty to the menopause, to prevent it from lapsing into the infantile condition or undergoing atrophy, and to prepare its mucous membrane for the maintenance of the ovum. If the ovum be fertilized the corpus luteum is responsible for maintaining the raised nutrition of the uterus during gestation. If the ovum be unfertilized it merely produces the hyperemia of menstruation and then undergoes degeneration until it is renewed in a fresh position.

Most observers are agreed (with a few exceptions) that estrum and menstruation do not occur after the ovaries have been extirpated, and that the phenomenon of menstruation is brought about by an internal secretion from the ovary. As stated above, Frankel believes this secretion is supplied by the corpus luteum. But Marshall contradicts this by his statement that in most mammals ovulation does not occur until estrum. He mentions that in the rabbit ovulation may not take place until stimulated

by coition, and in the dog ovulation occurs after external bleeding has been in progress for several days. Marshall is of the opinion that in our domestic animals the act of menstruation precedes estrum. In relation to the bovine, our observations are different from those recorded by Marshall. We have noticed that cows frequently menstruate, not markedly but noticeably so, two to three days following estrum. We also believe that in most cases where cows are bred and fertilization takes place, menstruation does not occur. If the ovum remains unfertilized, or if the fertilized ovum is aborted, menstruation usually follows. We have, however, known of individual animals to have menstruated after service, yet having been successfully fertilized. Most herdsmen are now cognizant of the fact that cows or heifers, particularly heifers, which menstruate following service will again be in estrum at the termination of the next dioestral period.

Marshall and Jolly state that corpora lutea are not present during the proestrum, and are therefore functional only subsequent to ovulation. We believe that generally speaking this statement is true, but when applied to the bovine it should be modified. We have upon numerous occasions found cows to be in estrum in which a corpus luteum was present.

In relation to the function of the corpus luteum and the causation of estrum, Marshall and Jolly conclude as follows:

The ovary is an organ providing an internal secretion which is elaborated by the follicular epithelial cells or by the interstitial cells of the stroma. This secretion circulating in the blood induces menstruation and heat. After ovulation, which occurs during estrus, the corpus luteum is formed, and this organ provides a further secretion whose function is essential for the changes taking place during the attachment and development of the embryo in the first stages of pregnancy.

It is our belief that the corpus luteum bears a much closer relationship to estrum than the researches of Marshall and Jolly would indicate. Particularly is this true in the cow. The corpus luteum in the cow probably does not undergo as rapid degenerative changes as it does in other domesticated animals. This may be the explanation of the fact that mares come in heat following parturition much earlier than do cows. In cases (with few exceptions) where the corpus luteum fails to degenerate or become absorbed it interferes with estrum. This kind of a structure has been termed a persistent corpus luteum. In

non-pregnant cows in which there is an absence of estrum, and in which there is a corpus luteum present without other extensive pathologic conditions, the removal of same is with marked and astonishing regularity followed by estrum within three to five days. The corpus luteum undoubtedly interferes with ovulation mechanically and by the elaboration of an internal secretion which exerts an inhibitory action on the maturation of the Graafian follicles.

We have examined a large number of cows in our clinic for the purpose of determining the reason or reasons for the absence of estrum. Many of these animals, in so far as we were able to judge from a physical examination, had (with the exception of a persistent corpus luteum) normal reproductive organs.

The corpus luteum was removed, or, if difficult of removal, was massaged for the purpose of making its enucleation more easy at the next examination, which has usually been at intervals of ten days to two weeks. Invariably estrum would follow within three to five days after operating. There were, however, exceptions to this rule, as some cows came in heat as early as two days after being operated on, while others required as long as ten days. In some cows estrum undoubtedly did take place, but went unnoticed, and for this reason it was thought that the removal of the corpus luteum did not produce the well-known signs of heat. Examinations for such cases will as a rule reveal the presence of a newly formed corpus luteum. We have operated on cows where there was a persistent corpus luteum in the left ovary. Estrum took place within a few days when they were bred and then watched carefully for the presence of the next estrum. If heat did not occur they would be returned to the clinic again within forty to sixty days, the length of time being determined by the age of the animal. At this time an examination for pregnancy was made, and in those which proved to be pregnant we would frequently find a right horn pregnancy, with the corpus luteum of course located in the right ovary. In cases where the persistent yellow body was removed from the right ovary, the above described changes were frequently reversed. This sort of evidence supports the theory that the corpus luteum does interfere mechanically with ovulation in the ovary in which it is located, and probably by some internal se-

cretion which inhibits ovulation in the opposite ovary. Where the corpus luteum has undergone a certain amount of atrophy and has become deeply situated within the ovary it is often necessary to practice ovarian massage for a number of weeks before it can be safely dislodged. In one or two cows we have had to resort to ovariectomy, and in each instance estrum appeared as soon as healing was complete.

The removal of the corpus luteum in the early stages of gestation is followed by the expulsion of the embryo or fetus within a few days. If a small portion of the lutein tissue remains, regeneration may take place to such an extent that it may prevent abortion. Heifers that have been bred too young, or in cases where purebred heifers are in calf to scrub sires, the removal of the corpus luteum will usually produce the desired results. This operation can probably best be performed as early as one can be certain the animal in question is pregnant.

The following case report serves as an illustration of the relation of the corpus luteum and estrum:

The patient, a purebred Aberdeen Angus cow, age four or five years, was reported to have failed to show symptoms of heat since her last calving. She calved successfully four or five months prior to the date on which we were consulted. An examination revealed the presence of a corpus luteum. All other reproductive organs were believed to be normal. We removed the corpus luteum and advised breeding as soon as estrum appeared. Estrum was noticed and cow was served within a few days following the operation. She again appeared in heat at the termination of the dioestral period and was rebred. No further signs of heat developed and it was thought she was in calf. Near the termination of gestation she was examined for pregnancy, but was found to be open or not in calf. There was a corpus luteum present and mild cervicitis was at this time detected. Since that time this animal has been under our close supervision, and up to the present time, in so far as we have been able to determine, has never appeared in estrum, except when we have removed a corpus luteum, which has been performed a number of times. We have allowed her to pass over three, four or five periods of heat, thinking possibly she might have conceived, but in each instance the examination for pregnancy showed that conception had not resulted. It is not of

course entirely improbable that she may have aborted an embryo or two, but a close watch has failed to reveal any evidence of an abortion. The cervicitis responded to treatment, which has apparently had little or no effect on the act of estrum.

During our studies of sterility we have not met with a closely similar case. Our experience shows quite conclusively that cows affected with sterility due to the presence of a persistent corpus luteum respond rapidly and regularly to treatment. In many cases conception takes place on the first service. There are, however, exceptions to this rule.

RELATION OF CORPUS LUTEUM TO PYOMETRITIS

Pyometra is a condition of the uterus in which there are chronic inflammatory changes of the uterine mucosæ characterized by sacculation of one or both of the horns and flaccid muscular walls with little or no contractile power due to a loss of muscle tone. The uterus is asymmetrical, abdominal in position, and one or both horns are partially filled or distended with pus. The cervix is inflamed and more or less dilated. This pathologic condition most often occurs in cows which have suffered with retention of the fetal membranes, but is known to occur in cases where the membranes were promptly discharged after calving. One of my colleagues working with the bacterial flora of this condition has in the large majority of cases been able to isolate *Bacillus pyogenes*, which is apparently the predominating organism in these types of infection.

The history of pyometra is as follows: The owner or herdsman in describing these cases states that the affected animal has not been in estrum since calving and that a small pool of pus is as a rule found back of her after she has assumed a recumbent position. They also notice that there is more or less straining of the lips of the vulva together with collection of pus on the under surface of the tail. In innumerable instances cows suffering with pyometra are allowed to go for a period of six or seven months before the services of a veterinarian are employed. In the treatment of pyometra, unless begun early, the prognosis should always be guarded, the reason for this being that even though the uterus undergoes complete involution and estrum is regularly established, the regeneration of the mucous membrane is so slow that attachment of the fertilized ovum is made diffi-

cult. Or in cases where the ovum does become imbedded, early abortions are not infrequent.

The veterinarian who is experienced in the treatment of sterility fully appreciates the value of the dislodgement of the corpus luteum in the successful treatment of pyometra. In cows where the disease has been present only a short time the corpus luteum will frequently be found near the surface of the ovary, but in the long-standing cases the yellow body will be found to be more centrally located and therefore more difficult of ablation. The dislodgment of the corpus luteum in its entirety is responsible for such rapid changes in the uterus that one wonders at so much power being invested in so small a structure. Not only does the uterus promptly discharge its contents through the reestablishment of muscle tone, but it also changes rapidly, morphologically, regaining its symmetry and normal anatomical position within a very short time. Estrum frequently, though not regularly, appears within three to five days, especially in cases where tissue destruction has not been extensive. In the treatment of pyometra it is deemed best to siphon off the contents of the uterus before attempting to remove the yellow body. In this way the ovaries can be more readily and safely examined. The uterus can be retracted so that the ovary or ovaries can be without difficulty brought into the pelvic cavity, when the corpus luteum can be manipulated through the vagina. If the yellow body is deeply situated it should be removed per vagina, and no doubt this procedure should be followed regularly. We have, however, removed a large number of corpora lutea by pressure exerted through the rectal walls without bad results. In carrying out some experiments with pyometra we decided to remove the corpus luteum without attempting to siphon off the contents of the uterus, which, if performed, undoubtedly facilitates involution.

The following cases are reported:

No. 1.—The patient, a purebred Jersey heifer, calved normally on February 10, 1921. The calf was normal and the fetal membranes were promptly discharged. The vaginal discharge gradually lessened, lactation was thought to be normal, and the appetite was unimpaired. A few weeks after calving the herdsman noticed that usually in the mornings there would be a small pool of thick cream-like pus in the gutter behind the heifer.

It was noticed also that there were accumulations of pus on the edges of the vulva and on the under surface of the tail. Estrum was absent.

On April 22, 1921, we examined this animal and found her to be affected with pyometra. The right horn of the uterus was elongated, enlarged, and filled with pus. The left horn was apparently only slightly affected. A corpus luteum, which was located near the surface, was found in the right ovary. The external cervix was only partially dilated and did not permit of the escape of pus when the uterus was massaged. The removal of the corpus luteum was somewhat difficult, which was due to the fact that the ovum was carried so far forward into the abdominal cavity. The distended horn interfered with the operation only slightly. The yellow body was removed and torsion applied to the ovary until it was thought that the hemorrhage had been controlled. The heifer continued eating and evidenced no signs of discomfort. The herdsman was advised that there would be a considerably larger amount of pus in the gutter by morning. She was operated on about 8:30 p. m. The next morning two or three liters of a grayish-white cream-like pus was found. The discharge continued for two or three days and ceased. Estrum took place four days after the operation. On April 30 she was again examined and found normal, the uterus having undergone complete involution. We advised breeding on the third or fourth estral period. Prognosis in this case is favorable.

No. 2.—The animal, a purebred Holstein-Friesian cow, five years of age, calved last on November 28, 1920. A normal healthy calf, but fetal membranes were retained. On March 26, 1921, she was examined and found to be suffering with pyometra. Cervicitis was found to be fairly extensive. Both horns of the uterus were enlarged, elongated, flaccid, and filled with pus. A large prominent corpus luteum was found in the right ovary. On March 28 we removed the corpus luteum by way of the rectum, and on the next day large quantities of pus were flowing freely. This material gave off an offensive odor. Cultures were made from the pus, which was obtained from swabs that had been introduced into the internal cervix and body of the uterus. *Bacillus pyogenes* was isolated without difficulty. April 2 estrum appeared, and in the uterus, with the exception of incomplete return of muscle tone to the right

horn, involution was almost complete. The cervix was treated regularly with Lugol's solution undiluted. This cow rapidly grew better and was dismissed from the clinic April 15, 1921. Since going home she has been bred twice, and it is questionable if she is now in calf. No doubt extensive tissue changes were present in this case, and regeneration of the uterine glands and surface epithelium will be slow. I would not be surprised to hear later that this cow has aborted a two or three months old fetus. I would not advise early breeding in this type of cases, and the prognosis should be guarded.

The manner in which the uteri of the above reported cases with such rapidity regained their normal structure and position is quite remarkable.

No. 3.—A purebred Holstein-Friesian cow, aged 6 years, weight 1,400 pounds, in good physical condition, having calved last in October, 1920. She gave birth to a healthy calf, but retained the fetal membranes, which were manually removed. We examined this cow on April 16, 1921, and found her to be affected with pyometra. No signs of estrum had been noticed up to this time. The symptoms observed here were typical of pyometra, and upon physical examination pathologic conditions or changes similar to the ones described in the second case were found. In this case the corpus luteum was located in the left ovary. Cervicitis was extensive with hypertrophy of the external os. We operated on April 17, and on the 18th the uterus was found to be practically empty, the left horn was greatly reduced in size, being almost as firm as the right horn, and when stimulated by massage contraction was very noticeable. The os uteri, which was dilated in the beginning, was contracting slowly. The appetite remained good except that she refused grain feed following the operation. The milk flow increased markedly and signs of estrum appeared within a few days. Cultures taken from the pus from the vagina and cervix showed growths of *Straphylococcus albus*, scattered colonies of hemolytic streptococci and *Streptococcus viridans*. These types of organisms predominated. Colonies of *Bacillus pyogenes* were present, but not in large numbers. On April 25 this cow was practically normal. Clear mucus was discharged from the vagina, and the cervix was reduced in size and not so highly colored. April 30 we again swabbed the cervix with Lugol's iodine solution, and as the patient was apparently normal she

was dismissed from the clinic. Prognosis in this case is guarded. We are of the opinion that she will again get safely with calf, although she may suffer an abortion before so doing.

No. 4.—A purebred Guernsey cow, 5 years, weight 1,050 to 1,100 pounds; good physical condition; last calving date June, 1920. She gave birth to full-time but dead calf. Fetal membranes were retained. This cow was presented in our clinic January 13, 1921. Here was a case of approximately six months' duration. On physical examination we found the os uteri partially dilated, permitting the escape of only small particles of pus when massage was applied to the uterus. The uterine horns were both greatly enlarged, flaccid, abdominal in position, and filled with an offensive smelling, creamy pus. Small amounts of this material were discharged when the cow was recumbent. A corpus luteum was removed from the right ovary on January 17, 1921, without producing any noticeable physical pain. The appetite was impaired for a day or two and somewhat capricious for perhaps a week, but she rapidly rounded to, and the milk flow was increased. On January 24 the uterus had undergone almost complete involution. It was then pelvic in position, but the right horn was still larger and longer than the left one. The cervix was treated at regular intervals, and while recovery seemed fairly rapid in this case, prominent signs of estrum did not appear until March 7, 1921. A few days later we again examined this cow and, thinking that she had fully recovered, we shipped her home. Since leaving our clinic she has been in heat regularly and has been bred two or three times, but has failed to conceive. We examined her a few days previous to this writing and found that a large abscess had formed in the right ovary. The oviduct on the same side is probably also involved. The infection has no doubt extended along the mucous membrane of the tube, entering into the wound produced by the enucleation of the yellow body, or gaining access to the ovary at the time of rupture of a ripe ovisac. We advised ovariectomy, as the cow is a valuable one. Prognosis is unfavorable.

THE CORPUS LUTEUM AND MUMMIFICATION OF THE FETUS

Mummification or desiccation of the fetus is not at all uncommon in bovine practice, but is not of course as common as pyometra. Just what relationship bacteria bear to this phenomenon has probably not been definitely determined. Bang reports

having isolated *Bacterium abortus* from mummified fetuses. It would seem to the writer that possibly *Bact. abortus* Bang is the causative factor in a certain percentage of these cases. A careful bacteriological study of desiccated fetus would be of great interest and value. W. L. Williams, in his recent publication, "Diseases of the Genital Organs of Animals," states that inter-placental hemorrhage with fetal desiccation is an interesting and an important clinical manifestation of placental disease. It has not been shown to be dependent upon disease of the nonplacental uterine areas. As a result of the hemorrhage the placental membranes are forced apart, and the fetus, which succumbs, becomes surrounded by a hematoma which soon undergoes secondary changes until it becomes a soft, plastic, chocolate colored material surrounding the fetal envelopes and fetus, which in turn becomes mummified.

The diagnosis of mummification of the fetus is not difficult. The history of the case is invaluable and the operator should give this due consideration in connection with the physical examination. The uterine seal is well formed and the corpus luteum may be deeply imbedded, or, in cases of not too long standing, it will project to the exterior. The removal of the corpus luteum will in the large majority of cases cause an expulsion of the uterine contents within three to ten days. In other cases where the yellow body has suffered with degenerative changes and the contractile powers of the uterus is at low ebb, the seal should be broken down and if necessary douching should be performed. In certain of these cases we have been able to remove successfully the corpus luteum through the vagina, while in others it has been necessary to operate per rectum. We have never in these cases had to resort to ovariectomy in order to dislodge the corpus luteum, but no doubt this operation may have to be performed, especially in cases where the corpus luteum is small, centrally located, and difficult of manipulation. In the past two years we have operated on six of these cases, one of which, a purebred Guernsey cow, has been returned a good breeder, having had one healthy calf since the operation. In another which we treated a long time for pyometra, conception occurred early after treatment, but the fetus became mummified, and on account of her having been unable to produce a healthy calf over so long a period of time she was sent to

slaughter. The other cases, with the exception of those which were sent to slaughter, have not been followed up, so that I do not know of their ultimate outcome.

The expulsion of the corpus luteum works wonders in these cases, and one should not depend upon other means of delivery. The corpus luteum bears a close relationship to both estrum and involution of the pathologic uterus, and the veterinarian who is doing cattle practice, if not already familiar with the workings of this gland of internal secretion, should immediately familiarize himself with it, for not only will he increase his activities as a cattle practitioner, but his clientele will be more appreciative of his ability, and his services in other fields of practice will be more eagerly sought for.

BIBLIOGRAPHY

- BORN, G. Contributions to the Physiology of Mammalian Reproduction
ESCHER, H. H. Über den Farbstoff des Corpus luteum. Zeitsch. f. Physiol. Chem., vol. 83 (1913), s. 198
FRAENKEL, L. Die Function des corpus luteum. Archiv. f. Gynah., vol. 68 (1903), p. 438.
PALMER, L. S., and KENNEDY, C. The relation of plant cartinoids to growth and reproduction of albino rats. Jour. Bio. Chem., vol. 46 (1921), p. 562.
MARSHALL, F. H. A. The Physiology of Reproduction, 1910.
MARSHALL, F. H. A., and JOLLY, W. A. Contributions to the Physiology of Mammalian Reproduction. Philosophical Trans. Royal Soc., London, Series B, vol. 198 (1906), p. 99.
NOVAK, E. The corpus luteum, its life cycle and its role in menstrual disorders. Jour. Am. Med. Assoc., vol. 67 (1916), p. 1285.
WILLIAMS, W. L. Diseases of the Genital Organs of Animals, 1921.
-

The Farmer says: There is no reason why livestock producers should not cooperate with the packers or any other marketing agencies in a campaign to increase the use of meat products. The fruit men of the West and the dairymen have pointed out the way to boost consumption, and they are profiting by the increased demand. Why not apply the same idea to the livestock business?

National Stockman and Farmer says: Where are the trotters necessary to entertain the crowds at county fairs to come from five or ten years hence? Not enough are being bred to keep up the horse population. Better breed that well-bred mare.

SOME OBSERVATIONS RELATING TO SEX DETERMINATION AND THE EMBRYOLOGY OF THE UTERUS ¹

By J. P. FOSTER

Minneapolis, Minn.

NOT MANY YEARS have elapsed since biologists quite generally entertained the opinion that sex determination did not occur at the time of the fertilization of the ovum. It was held that Nature did not decide this important matter until the embryonic stage was fairly well advanced. This belief was strengthened by the fact that the Wolffian ducts and the Mullerian ducts—forerunners of essential portions of both the male and the female generative organs—are present in all normal embryos, and it was supposed that, after a decision had been arrived at, one set of sex organs progressed to full completion, while the embryonic structures representing the generative organs of the opposite sex underwent no further development and became atrophic.

In the male the Wolffian ducts go to form the excretory channels of the testicles, and vestiges of the Mullerian ducts are represented by the uterus masculinus. In the female the Mullerian ducts develop into the Fallopian tubes, the uterus and the vagina, and vestiges of the Wolffian ducts are represented by the parovarium and the canals of Gaertner, found in either side of the walls of the vagina.

The fact that hermaphroditism occasionally occurs apparently corroborates the hypothesis of delayed sex determination and might lead to the supposition that the condition is referable to indecision on the part of Nature, resulting in the partial or imperfect development of both male and female generative organs.

Although it must be admitted that embryos do possess elementary structures from which organs of either sex may develop, this is not proof that sex was not determined at the time of the fertilization of the ovum. Neither does hermaphroditism prove delayed sex determination, for the reason that certain influences might be brought to bear upon the growing fetus which could

¹ Presented at the twenty-third semi-annual meeting of the Minnesota State Veterinary Medical Association, Hutchinson, Minn., July 14 and 15, 1921.

interfere with or modify the normal development of sexual organs in spite of definite sex determination at the time of conception.

In the light of more recent investigations it would seem that sex determination takes place simultaneously with the fertilization of the ovum.

The scope of this paper will not permit of reviewing the phenomenon of mitosis in ordinary tissue cells, the important details of which are more or less familiar to all. Suffice it to say that the present-day theory of sex determination is based in part upon this phenomenon.

A certain definite number of chromosomes have been demonstrated in the nuclei of the body cells of different species of animals. For instance, man has 48, the hog has 40, *Ascaris megalocephala* has 4, and one of the grasshoppers has 14. These numbers apply to the chromosomes of tissue cells, but not to those of the ova and the spermatozoa, the so-called functional reproductive cells. The reproductive cells undergo a process of maturation so that finally they contain only half the definite number of chromosomes required by the tissue cells of the species. The reason for this reduction is that while a tissue cell containing, say, 40 chromosomes divides so that each chromosome is split into two, each resulting in a daughter cell containing the original number of 40, it should be remembered that the chromosomes derived from the nuclei of both the ovum and the sperm cell are present and take part in the phenomenon of fertilization. Therefore only half the number of chromosomes is needed from each source to make up the total required by the body cells of the species.

It will be noted that cell division in growing tissue cells is a much simpler process than the phenomenon of the fertilization of an ovum by a sperm cell. The latter implies either fusion of the individual chromosomes or their arrangement in such a manner that when cell division takes place half of the chromosomes furnished by the ovum and half of those derived from the sperm cell will be present in each of the two daughter cells, marking the beginning of a new being embodying the hereditary properties of both parents.

Investigators have shown that in a certain variety of grasshoppers the cells taken from different tissues of males contain 6 pairs of chromosomes of similar appearance and one chromo-

some differing from the others, making a total of 13. The tissue cells of females show 7 pairs of chromosomes, 6 pairs of which are apparently like the 6 pairs found in the male, and one pair resembling the odd or thirteenth chromosome of the male, making a total of 14. The female reproductive cells before their division into the functional reproductive cells (ova) contain the same number of chromosomes as the tissue cells just mentioned. However, after the final division the mature ovum contains only 7 chromosomes, 6 of which are alike, and one odd one, which represents, of course, one-half of the 6 pairs of similar chromosomes and the one pair of odd chromosomes found in the reproductive cell before its division to form the functional reproductive cell. As already stated, the tissue cells of the male contain 13 chromosomes, which number applies to the reproductive cells before the final division into the functional reproductive cells, the spermatozoa. It is evident that there must be two kinds of sperm cells occurring in equal numbers: one kind containing 7 chromosomes, the other containing 6, as a result of the division of a reproductive cell containing 6 pairs of chromosomes and one odd chromosome, or 13 in all. If an ovum which invariably contains seven chromosomes is fertilized by a spermatozoon containing 6 chromosomes, an individual will develop containing 13 chromosomes in its body cells, therefore a male. On the other hand, if an ovum is fertilized by a spermatozoon containing 7 chromosomes, an individual containing 14 chromosomes in its body cells, or a female, is the result. The odd chromosome in the ovum and the odd chromosome in the female determining spermatozoon are referred to by biologists as the accessory, or X, chromosome. In the human, according to Van Winewarter, the male-determining sperm cell contains 23 chromosomes, while the one determining female sex contains 24.

The matter of "identical twins" is interesting on account of the probable relationship to sex determination. In ordinary twins two ova are fertilized. These ova result from the rupture of two Graafian follicles in the same ovary, or from two Graafian follicles one of which is situated in each ovary. Three possibilities are presented. First, each of the two ova may be fertilized by a male-determining sperm cell, resulting in twin males. Second, each of the two ova may be fertilized by a female-determining sperm cell, resulting in twin females.

Third, one of the ova may be fertilized by a male-determining sperm cell, and the other ovum may be fertilized by a female-determining sperm cell, resulting in twins, one a male, the other a female. On the other hand, "identical twins" are the result of a complete division of one ovum or blastoderm, resulting in the formation of two distinct embryos. As sex was determined when the ovum was fertilized, prior to its division, the twins are of the same sex. Each has its own amnion, but they are inclosed in one chorion. The common chorion is considered proof of this form of pregnancy.

A prominent writer on the subject of genetics recently made the following observations:

Breeders of dairy cattle in particular often become discouraged with a bull which seems to sire largely bull calves. It must be remembered in this connection, however, that rather large departures from equality may occur simply by chance. Thus if a coin is tossed 20 times, the best expectation is 10 heads and 10 tails, but about once in 40 times a departure as great, or greater, than 15 heads or tails is to be looked for. Thus a large number of dairy cattle breeders may be expected to get 15 or more bull calves out of 20 calves born. Such a result in one year would not have the slightest effect on the sex ratio the next.

Another well-known authority states that "sex seems to be determined by one of the chromosomes, and is probably settled at the time of conception. The determination of sex is therefore a matter of chance over which the breeder has no control. For practical purposes, the breeder will find that, over a period of years, he gets nearly equal numbers of both sexes."

Reference has been made to elementary structures known as the Mullerian ducts, found in all normal embryos. In animals having rather prolonged periods of gestation, such as the mare and the cow, they appear early in the second month of pregnancy as two rods of mesoblastic tissue arising in the right and left sublumbal regions, converging caudally in the form of a V near the posterior common body opening or cloaca. The rods become hollowed out to form tubes, and near the end of the second month the extremities of the ducts, which already are in contact with each other, become fused. The coalescing of the two tubes—right and left—results caudally in the formation of a single medial tube, the length of which depends upon the extent of the fusion; and the structures which at first resembled a V in form now resemble the capital letter Y. The opening of each duct into the peritoneal cavity in the sublumbal region repre-

sents the future ostium abdominale of the Fallopian tube. The fused medial tube represents the future vagina and, in those species in which the fusion progresses beyond this point, the body of the uterus.

The following observations relative to the uteri of various species are taken from Williams's "Veterinary Obstetrics":

Derived from the ducts of Muller, it (the uterus) varies greatly in form and disposition, partly dependent upon the degree of fusion between these two structures. There are generally recognized a uterine body and two cornua, each having essentially like functions in varying degrees.

In the rabbit there exists no uterine body, but two distinct tubular uteri, opening separately into the vagina. In the bitch, cat and sow the uterine body is limited in extent and physiologically unimportant, rarely containing even a portion of a fetus except in transit at the time of birth, while the two cornua are extensive, and in them develop virtually all fetuses so that, physiologically, they represent the two separate uteri of the rabbit.

In ruminants the uterine body becomes markedly greater in size, and assumes far higher importance physiologically, while the cornua remain relatively large. In these animals the one, two, or more fetuses habitually rest almost equally in the body and cornua, so that they represent a middle point in the transition between the double uterus of the rabbit and the single uterus of woman, physiologically devoid of cornua. In the mare the uterine body becomes relatively more important than in the ruminant.

The relative importance of the cornua to the uterine body sustains a close relation to the number of young brought forth at a given birth. In multiparous animals there are two uteri, as in the rabbit, or the two extensive cornua with functionally unimportant uterine body, as in the bitch, cat and sow. In ruminants, which are largely biparous, the uterine body and cornua become approximately equal in extent and function.

In the normally uniparous mare the cornua are smaller than the body, while in woman the uterus is virtually without cornua in size or function.

In the larger animals, like the cow, size of the parts readily permits of extensive rectal palpation and manipulation of the uterus, tubes and ovaries, thereby making it possible to carry out the excellent work that is being done at the present time in the early diagnosis of pregnancy and the treatment of sterility.

Washington Post publishes a cablegram from Paris to the effect that "Bully beef, from Chicago, known to the poilus as 'tinned monkey,' may be the poor man's menu this winter. The Department of Agriculture is suggesting a series of propaganda campaigns to develop an appreciation for tinned meats."

SOME SURGICAL OPERATIONS ON THE OX

By H. E. BEMIS

*Professor of Surgery, Iowa State College,
Ames, Iowa*

IN presenting this paper it is my intention to outline treatment for some of the common surgical conditions affecting the ox, excluding from the discussion the surgery of the reproductive organs, which has been so well presented before your association at recent meetings. The conditions presented in this paper are those which need special consideration on account of the differences in the anatomy of the region affected from the anatomy of the same regions in the horse, with which we are probably more familiar. We all realize that the present trend of affairs is constantly leading the veterinarian toward greater practice on conditions affecting the food-producing animals, and it is extremely important that the special problems affecting each species be emphasized.

DRAINAGE OF THE FRONTAL SINUS

The frontal sinus of the ox is very different from that of the horse, particularly with respect to its extent superiorly and the fact that it is partially divided by many bony septa, which makes direct drainage through the cavity impossible. Aside from the usual description of the frontal sinus as given in Sisson's Anatomy, I wish to call attention to the following facts:

1. The frontal sinus in many specimens extends posterior to the region of the poll or frontal eminence and laterally to a point just anterior to the external ear.
2. The deepest and freest portion of the frontal sinus is found about midway between the base of the horn core and the median line. The cranial plate arches upward in the center of the skull inferior to this free portion so that the cavity is limited to the lateral borders on a line drawn across the narrowest portion of the head, about midway between the posterior border of the orbital cavity and the base of the horn.

¹ Presented at the twenty-third semi-annual meeting of the Minnesota State Veterinary Medical Association, Hutchinson, Minn., July 14 and 15, 1921.

In the plane which passes through the posterior borders of the orbital cavity the sinus again swings toward the median plane and at this point constitutes the second largest cavity and marks the lower limit of the frontal portion of the sinus. Upon a plane passed through the middle of the orbital cavities, the frontal portion of the sinus is usually separated from the turbinal portion of the sinus by a complete septum.

The same idea may be expressed in a different and perhaps clearer way by stating that if a horseshoe having wide webbed branches and a narrow toe should be placed upon the ox's head so that the upper branch would rest upon the median line in the region of the poll and the toe of the shoe would rest upon the lateral portion of the frontal region at its narrowest point, the lower branch would rest over the second most free portion of the sinus and any point covered by the shoe would be a safe point for trephining the sinus.

3. On a plane passing through the narrowest portion of the region a small opening about the size of a lead pencil passes from the floor of the sinus into a compartment which is separated from the temporal fossa only by a thin plate of bone. In case pus is retained in this compartment, the bone sometimes becomes necrotic and an abscess develops, posterior to the eye and occupying the temporal fossa.

4. From the lower limit of the frontal portion of the sinus on a plane passing through the center of the orbits and about one and one-half inches from the median line, the frontal sinus communicates with the nasal cavity through the ethmoid cells. From a trephine opening located as just described, drainage may be established through the nose by passing a curved instrument from above to below and directed slightly toward the median line.

The frontal sinus of the ox usually becomes infected following accident to the horn or dehorning operations. In these cases one usually has a means of entrance to the superior free portion of the sinus. The other two points where it is most practicable to trephine the sinus for further drainage are over the toe and the lower branch of the horseshoe-shaped area already described. From the first of these the compartments in the temporal fossa may be flushed, and from the second one bottom drainage may be established through the nasal cavity. If

an abscess forms in the temporal fossa it may be drained by an incision through the skin at the most prominent point. Such drainage is not complete and usually constitutes a temporary relief until animals can be marketed.

EXCISION OF THE EYE

The frequency of the occurrence of accidental wounds, abscesses and malignant tumors of the eye of the ox often makes it necessary or desirable to remove the entire structure. We believe that the most satisfactory method of performing this operation involves the complete removal of the conjunctiva so as to prevent the formation of secretions which result in constant discharge.

To perform the operation, confine the animal on the table or ground, and carefully remove, by shaving, the hair of the lids and surrounding area and paint the surface with tincture of iodine. With a small hypodermic needle inject subcutaneously a liberal amount of local anesthetic, such as 1 per cent solution of stovaine, apothesine or procaine, containing adrenalin chloride in a 1-to-5,000 solution, into the upper and lower lids, about 1 cm. from the border of the lids. Follow this by injecting about 1 c.c. of the same solution at four different points into the depths of the region posterior to the orbit.

Suture the upper and lower lids together with a continuous silk suture, confine the skin of the lids with tissue forceps, and with a very sharp knife make an incision through each lid about a quarter of an inch from their borders, uniting the incisions the same distance beyond the lateral and medial canthi. The incision should pass to but not through the conjunctiva. The hemorrhage should at all times be carefully controlled so that this technique may be carried out after completing the incisions to a uniform depth throughout their extent. The conjunctiva is separated from the lids back to its attachment to the orbit. This leaves the conjunctiva attached to the border of the lids; which have been sutured together, and these tissues may then be used to apply attraction upon the orbit. After the dissection has been carried back to the point of insertion of the conjunctiva to the orbit, the muscles of the eye are clipped with a pair of curved scissors and finally the optic nerve is cut in the same manner and the orbit completely removed, the third eyelid being re-

moved with it. All of the periorbital fat should be left in place. The hemorrhage, which is not great, should be controlled with sterile gauze sponges and all blood clots removed from the cavity. The cavity is then packed with sterile gauze dusted with equal parts of chlorinated lime and boric acid well mixed together, or iodoform, and the cut edges of the lids are carefully sutured with interrupted silk sutures beginning at the external angle, omitting the last stitch to provide drainage. Remove the pack in twenty-four hours and inject into the cavity about one-half ounce of Bipp, which is a paste composed of iodoform 16 ounces, bismuth subnitrate 8 ounces, liquid paraffin 8 ounces.

Very little after-treatment will be found necessary. The cavity will fill and the edges of the lids become permanently healed together in about two weeks. The area is finally left somewhat sunken, but the surface is absolutely smooth and no discharging wound remains.

ACTINOMYCOSIS IN THE MANIBULAR AND PAROTID REGIONS

Actinomycosis affecting the glands of this region is quite common in cattle and often calls for some form of surgical procedure. There are two methods of dealing with this condition. The one involves complete removal of the diseased tissue and is indicated in case of circumscribed tumors in valuable animals which are to be kept for a considerable period of time. The second involves drainage and proper after-treatment and is indicated in case of butcher animals which are being fed for market. Here it is of advantage to use a method which will control the condition and at the same time incur the least possible loss of time and flesh.

Without enumerating the many problems connected with complete removal of such tumors, due to the large number of important structures in this region, I wish to emphasize a few important points in connection with the technique of the operation.

1. After thoroughly preparing the region and locating as far as possible structures to be avoided, a liberal elliptical incision should be made in a longitudinal direction, which should include any and all fistulous openings and should be large enough to remove all excess of skin due to the enlargement. The incision should be carefully carried to the line of

cleavage between the normal and diseased tissue. This line can be discovered most easily by beginning the blunt dissection as near the base of the tumor as possible at some point from which it will be more easy to work out in all directions than to attempt to find the line of cleavage over the periphery of the tumor.

Following the line of cleavage with blunt dissection, using the scalpel handle or Mayo scissors so far as possible, it should be possible to recognize any important vessels, ducts or nerves before they are sectioned. Vessels which must be cut should be ligated before being cut. Large vessels should be ligated at two points and then divided between these two points. The separation should continue until the tumor has been completely isolated. It is usually found that a small neck of diseased tissue extends into the depths of the region beyond the large portion of the tumor. This should not be cut across but completely removed.

If the wound area is large and important vessels are exposed, the tissue spaces should be closed and protected by suturing the tissues together in the depths of the wound. If there is a parenchymatous hemorrhage, a sterile gauze pack should be placed in the cavity and the skin united with interrupted sutures. It is important to warn the owner against the danger of post-operative hemorrhage, and to prevent this the animal should be closely confined in a stall where there is no opportunity for the animal to place pressure on the jugular region. A course of potassium iodide treatment may be given as a further safeguard against recurrence.

2. The second method has been found to be very practical and satisfactory in case of animals in the feed lot. It consists in thorough drainage of the process, followed by painting the cavity with tincture of iodine and then packing the cavity with gauze upon which has been smeared about half an ounce of paste made of equal parts of zinc chloride and sanguinaria. This pack should be sutured in place and allowed to remain for five to eight days, after which it is removed, together with the slough which has been caused by the pack. If practicable, it is well to carry out the potassium iodide treatment in these cases as well. Under such treatment we have found that the tumors make either complete recovery or sufficient reduction takes place so that the animal can be

marketed without loss, as there is very little if any loss of flesh due to the operation if an animal can be handled in the stocks or chute. For these reasons we believe this method to be practical, although not so satisfactory from a surgical standpoint.

RUMENOTOMY

I will not attempt to describe the indications for rumenotomy, but wish rather to direct attention to some of the important points in performing the operation. Many times the animal is in such a toxic condition that anesthesia is not necessary and the problem of control does not enter into consideration. If this is not the case, satisfactory anesthesia can be obtained by the use of local anesthetics injected subcutaneously along the line of incision. The animal may be controlled either in a standing or recumbent position, according to the circumstances.

After shaving the region of the left flank, the area should be carefully sponged out with bichloride of mercury, 1 to 1,000, and painted with tincture of iodine. The structures to be divided, named in order from without to within, are as follows:

1. Skin.
2. Subcutem and subcutaneous fat in variable amounts.
3. The external oblique muscle. The fibers of this muscle pass the region in very nearly a horizontal direction and are relatively thin.
4. Internal oblique muscle, and those arising from the ilium, whose fibers are considerably thicker and pass in a direction downward and forward, from the external angle of the ilium. A definite branch of the circumflex artery passes along the superior border of this portion of the muscle.
5. Transverse muscle of the abdomen, which in this region is entirely aponeurotic. The fibers extend in a perpendicular direction and are white and glistening in appearance and very thin.
6. The iliac fascia. This structure is thin and yellowish in appearance and is separated from the previously mentioned structure by aureolar tissue.
7. The subperitoneal fat.
8. Peritoneum.

The importance of knowing the various structures which are found in this region is that the operator may be able to recognize each structure by its color and direction of fibers and consequently may know at each step in the operation just how far the operation has progressed.

A perpendicular incision about 8 to 10 inches in length, starting at a point about equal distance from the last rib, the lumbar vertebræ and the external angle of the ilium, should be made through the skin, subcutem and external oblique muscle. The fibers of the internal oblique should be separated in their long direction, across the center of the wound, and likewise the fibers of the aponeurosis of the transverse muscle and the iliac fascia should be divided in the same direction as a skin incision. After separating the fat the peritoneum should be picked up with forceps, incised with scissors or scalpel, and completely divided with a blunt bistoury.

The divided edges of the peritoneum should be secured with forceps, which are allowed to remain in place during the operation. A liberal strip of sterile gauze should be placed within the peritoneal cavity, through the lower commissure of the wound, and finally the rumen divided liberally and the divided edges fixed with forceps or tape. Under this method a free opening is made through the abdominal wall and into the rumen and much less tissue is actually destroyed than by trying to operate by separating all of the muscles in the direction of their fibers.

After emptying at least two-thirds of the contents of the rumen the edges of the wound in the rumen should be carefully cleansed and the wounds united by using one row of interrupted or continuous silk sutures to adapt the edges.

This line of suture should then be buried for a distance of one-half to three-fourths of an inch by the use of a catgut Lembert suture, No. 2 or No. 3, passed in with a round-pointed needle, attempting to avoid passing the needle through the mucous membrane. Particular care should be taken to get equal apposition of the peritoneal surfaces, and especially so at the commissures. Within twelve hours following the operation a line of sutures so placed will be completely covered by a wound exudate and adhesion will begin to form.

After removing the gauze and preparing the wound edges, the peritoneum, still fixed in the forceps, should be pulled up and sutured with catgut. A few catgut sutures may be used to unite the muscle wounds or to obliterate spaces within the tissues, and finally the skin should be sutured with silk, leaving drainage in the lower angle of the wound and the

line of suture protected with gauze and collodion except at the drainage opening.

The points which I wish to emphasize particularly are the importance of the careful apposition of peritoneal surfaces, both visceral and parietal. I am thoroughly convinced that no abdominal wound is properly cared for which does not include these two precautions.

The complications may be peritonitis, abscesses in the wall of the abdomen, and fistula of the rumen. Peritonitis should be treated on general principles and abscesses treated by careful and complete drainage. By using catgut sutures in the depth of the wound I believe the number of abscesses can be reduced. If fistula results, the process should be allowed to heal as completely as it will, and if complete healing does not take place, the final tract should be curetted and cauterized with a hot iron or pure phenol, after which healing usually takes place.

AMERICAN TO DIRECT NEW BRAZILIAN COLLEGE

Dr. Peter Henry Rolfe, of Florida, has been appointed to direct the agricultural and veterinary college which is to be established in the State of Minas Geraes, Brazil. Ambassador Edwin N. Morgan reports that a credit of 1,000,000 milreis has been authorized to meet the initial expenses of the school.

U. S. COWS SUPERIOR

The American milk cows which have been distributed through Bavaria are declared to be better milkers than the German breed. The Bavarian farmers express astonishment that the American cows give about twenty quarts of milk daily after their first calf, which is double the quantity of German cows.

NEW BUILDINGS AT AUBURN, ALA.

The contract for the construction of three new buildings at the Alabama Polytechnic Institute at Auburn, Ala., has been awarded. The transaction involves \$125,000 and the structures are to be completed by January 1. One of the buildings will replace Comer Hall, the big agriculture building. The other structures will be used for veterinary science.

PROGRESS OF BOVINE TUBERCULOSIS ERADICATION IN MONTANA

By W. J. BUTLER

State Veterinarian, Helena, Montana

IN 1911 the Twelfth Legislative Assembly of Montana enacted Chapter 146, "An act to provide for the tuberculin testing of bovine animals, their quarantine, destruction, and disposition under the general supervision of the Livestock Sanitary Board." This law specifically required that all dairy cattle be tuberculin tested and that all reactors be destroyed or segregated and quarantined.

The difficulties that presented themselves in fulfilling this work were many. Montana is the third largest State in the Union; its ranches and dairy herds are widely separated. Practically none of our dairy herds are kept under pasture the entire year around. When cattle are dry they are turned out on the adjacent range. In the foot-hill country barns are made of logs, and in many sections where milking is done only during summer months there are no barns at all. In addition to this, due to the many settlers coming into the State, there are a number of one-cow dairies which carry on a dairy business from time to time as cows come fresh. Taking all of these adverse conditions into consideration, it will at once become apparent that the progress made by the State of Montana in cleaning up its dairy herds and eradicating tuberculosis in livestock is indeed remarkable. It gives a concrete example of what may be accomplished by an active and consistent campaign in the eradication of an infectious contagious disease.

The following table is the official record of the number of animals tested, the number of tuberculous animals found, and the percentage of tuberculosis for the years 1911 up to and including June 30, 1921:

Year	Tested	Tuberculosis	
		Reactors	Percentage
1911	7,799	829	10.63
1912	7,158	481	6.7
1913	6,769	371	5.4
1914	5,788	174	3.0
1915	13,851	345	2.4
1916	9,983	520	5.2
1917	13,781	707	5.2
1918	22,720	1,151	5.0
1919	26,661	752	2.82
1920	29,017	647	2.22
1921 (to June 30)	29,990	260	0.86
Total	173,517	6,237	3.5

It will be noticed that when tuberculin testing was first inaugurated 10.63 per cent of reactors (or tuberculous animals) were found. The second year was practically a retesting of the herds that had been tested in 1911. The percentage fell to 6.7. The testing of 1913-1914 was a repetition of the previous years' testing, in that methods of testing and funds did not permit an expansion of the work or the testing of new herds. Tuberculosis in the herds that had been tested fell to 3 per cent.

On September 21, 1914, the intradermic tuberculin test was officially recognized. This test is commonly called the "tail test." Previous to this time the States of Missouri and California had used the intradermic test, but Montana was the first State to adopt it officially as its recognized test and to guarantee its accuracy by paying the owner of any animal falsely condemned (through the use of the intradermic test) the full and true book value of the animal condemned. I think I may safely state that bovine tuberculosis in western States or in semi-range States will never be eradicated by the use of the old subcutaneous or temperature test. This for the reason that where the temperature test is used only gentle and well broken animals can be accurately tested. With the intradermic test any animal, wild or gentle, young or old, may be accurately tested.

With the adoption of the intradermic test the Livestock Sanitary Board issued an order that all cattle in any herd, young and old, wild and gentle, must be tested. The intradermic test brought to light the fact that calves may suffer from tuberculosis. It also demonstrated the fact that many dry dairy animals that were running out in the hills were also tuberculous. These calves and dry animals could not be tested with the subcutaneous test, and therefore until the adoption of the intradermic test

they were a constant source of reinfection to that particular herd. Strange as it may seem, we have found generalized tuberculosis in calves six weeks old. Such an occurrence hardly seems possible, but it is an absolute fact.

With the use of the intradermic test we were able to test more than twice as many cattle for the same amount of money as we had been able to test in previous years. In 1915 the percentage of reactors fell, even though we tested a number of new herds. The work in 1915 was expanded by testing in the Flathead district, where we tested thousands of cattle without finding one reactor. This is the principal reason for the percentage falling. Even though our percentage of reactors fell in 1915, we found considerable tuberculosis in previously tested herds. We realized there must be some outside source of infection. In most instances we found that their purebred bulls, which had been imported into the State since our last previous test, were tuberculous. These bulls had been shipped into Montana accompanied by an official tuberculin test chart issued by the State from which they originated, stating that the animals were free from tuberculosis and any infectious contagious disease.

To protect the stock interests of Montana the Livestock Sanitary Board issued an order that all purebred cattle shipped into the State would have to be shipped into quarantine and held subject to a 60-90 day retest.

Our figures for 1916 were a revelation. Out of 1,646 purebred animals shipped into the State, accompanied by an official tuberculin test chart, we found when we subjected them to our 60-90 day retest that 145 were tuberculous. No wonder that our herds were becoming reinfected when 8.8 per cent of all purebreds being shipped into the State, even though accompanied by a clean bill of health and tuberculin test chart, were tuberculous.

In 1916 the States of Minnesota, North Dakota and Montana held a meeting to protect themselves against the fraudulent importation of purebred cattle from outside States. This meeting provided for the 60-90 day retest in these respective States, and I feel safe in stating that the nation-wide tuberculosis eradication campaign is the result of the action taken by the States of Minnesota, North Dakota and Montana.

It will be noted that in 1916 our percentage of reactors jumped to 5.2 per cent. The principal reason for this was the testing of imported purebred cattle, and also to the testing of herds

where we knew they had recently acquired imported sires. It will be noticed that our percentage of reactors held fairly even for the years 1916, 1917 and 1918. Due to the enormous distances to be traveled, to climatic conditions, and the financial condition of the Livestock Sanitary Board it took us practically three years to clean up our herds which had been contaminated from outside sources. It might have taken us longer had not the United States Bureau of Animal Industry in 1917 established its cooperative tuberculosis eradication campaign. We did not receive very much help in 1917, but we did receive considerable help in 1918, and ever since that time have received efficient and well directed cooperation from the United States Bureau of Animal Industry.

With the knowledge of the work accomplished and with the careful studying of our official records one is safe in stating that the peak load of our work in bovine tuberculosis eradication has been reached and that gradually, but surely, bovine tuberculosis in Montana is being eradicated.

The figures for the first six months in 1921 indicate beyond words the progress of our work. We have tested 29,990 cattle and have found but 260 tuberculous animals, a percentage of 0.86. In 1922 even this percentage should be decreased, and we sincerely trust that each year it will grow less and that the work of the Livestock Sanitary Board will be crowned with the achievement of having eradicated bovine tuberculosis in the State of Montana.

During the past ten years we have destroyed 6,237 cattle which could have been and which were in many cases a source of infection to the human family. It must also be realized that had these animals been permitted to live they would have infected countless other bovine animals, which in turn would have been a source of infection to the human family. Taking these facts and figures into consideration, the milk-drinking public must realize the protection which is being given them and their children by the Montana Livestock Sanitary Board in the eradication of tuberculosis.

The fact that in 1921 we found only 0.86 per cent of tuberculosis in all cattle tested is a positive assurance to the State and the world in general of the cleanliness and purity of Montana dairy products and the healthfulness of Montana livestock.

PARTURIENT PARESIS OF THE DAIRY COW¹

By A. A. MOTLEY

Alpena, Mich.

PARTURIENT PARESIS is a disease affecting especially the dairy cow following parturition, rarely before or during birth, and is generally of a nonfebrile nature, resulting in a general paralysis, or, in nontreated cases, death.

The cause of this disease is still unknown. Although many theories have been advanced as to the cause, none of them have been generally accepted.

The first symptoms are generally manifest from 12 to 72 hours following the birth, although cases are occasionally met where the first symptoms are noticed within an hour following the birth, and still more rare where several weeks have elapsed. It is a noticeable fact that cases that develop extremely late more often develop tympanites and coma early during the attack. These late cases may or may not be true parturient paresis; in fact, they rather suggest auto-intoxication, but the fact remains that they do answer favorably to the same treatment employed in the typical cases.

The earliest symptoms probably noticed are greatly decreased lactation, uneasiness, treading with the hind feet, possibly getting up and down. This uneasiness continues from one-half hour to several hours, when animal reaches a state when she can no longer stand and goes down, lying on her sternum with her head to her side, tears wetting the face and presenting a picture of absolute helplessness, and if left alone, will gradually pass into a state of coma, when the position is changed to lying flat on the side. The temperature, while generally subnormal, is occasionally found to be as high as 103° F.

I will now discuss the different treatments I have used and results given.

During my early experiences the Schmidt treatment was used, with varied results. The percentage of recoveries with this treatment was not nearly so great as with the air treatment, and

¹Presented at the fifty-eighth annual meeting of the American Veterinary Medical Association, Denver, Colo., September 5-9, 1921.

sequelæ were far more numerous. Many would gain their feet only to die of pneumonia in a few days; others would develop mammitis, eventually the gland function being lost, and those that did recover did so very slowly. These sequelæ were met regardless of how strict aseptic precautions were employed when treatment was administered.

The next treatment was the trikresol treatment advocated at the time by Dr. Samuel Brenton of Detroit, Michigan. This treatment consisted of trikresol and glycerin, equal parts, 2 drams of this mixture in a quart of sterile lukewarm water and distributed equally in the four quarters of the udder. This treatment gave excellent results, with no sequelæ; in fact, it proved the next best to the sterile air treatment.

The past few years we have had the sterile air treatment and the oxygen treatment. My experience has been entirely with the sterile air, which, on account of the convenience and gratifying results, has been all that could be desired. The results from this treatment have been so favorable that many think that all that is necessary is to inflate the udder of the patient and she will recover. Granting that this is true in the majority of cases, it is for the few that will not, that we deem the following important:

The position in which the patient is kept during the attack is practically as important as the air treatment, as the cow whose udder is inflated and then allowed to remain lying on her side, as they do in the comatose state, has little chance for recovery. The first thing upon arrival is to roll animal upon her sternum and insist that she be kept in this position during the entire time she is unable to stand. One-half a grain of strychnin sulphate is then given subcutaneously, and repeated in six hours if necessary, but I never give more than half a grain for initial dose and sometimes less if the animal is of the small type. The bovine does not tolerate strychnin as the equine, many seeming peculiarly susceptible to its action. Some practitioners prefer atropin, but personally I prefer strychnin, except in those cases where the patient seems very excitable, or those that occur on hot, sultry days. Cases on such days always deserve a more guarded prognosis.

The udder is then inflated after washing the teats and tube with a mild cresol solution. The teats are not tied, as by press-

ing the end of the teat for a few seconds the air will cease to escape. If a case is met where it seems necessary to tie the teats, a piece of gauze bandage may be used, but should only be allowed to remain for a short time. Milking before inflating is not necessary, as a very small amount of milk is present.

In connection with the inflation of the udder, I wish to condemn the use of the bicycle pump as an instrument for this purpose. This practice should be discouraged, as it leaves a bad impression with the client and it may injure the mammary glands. Hemorrhage within the glands has been known to occur following the vicious use of a pump.

It is practically impossible to overinflate the udder with a small hand bulb outfit. If patient does not recover in six hours the udder is reinflated. The cylinder of a bulb outfit should be filled with absorbent cotton which is dampened with a few drops of trikresol or other suitable antiseptic. Personally I am in favor of trikresol for this purpose because of the results obtained with the trikresol treatment.

I have had a few cases die while in the act of inflating the udder, and for this reason it seems best to administer the strychnin before the air, as since following this procedure such a misfortune has never occurred.

After completing all work with the udder, if placental membranes are still retained they should be removed, which, in my experience, is always easily done. The membranes are usually detached from the cotyledons in these cases and lying in the uterus, and when they are attached they can easily be removed by slight traction.

It is important that the attendant be instructed not to milk until the patient has been on her feet and apparently normal in every way for at least three or four hours, and not to give or allow to be given a drench of any nature, as there seems to be danger from such procedure during and for twelve hours following a severe attack. The muscles of the neck and throat seem to be affected in these cases. A guarded prognosis must always be given in those cases which have been drenched before arrival of veterinarian. Catheterization should be performed on all animals which are in a comatose condition and also on those where the attack lasts to exceed six hours.

Occasionally a case is met where the animal regains a per-

feetly normal condition except a refusal to arise; patient eats, drinks and ruminates normally, and temperature, pulse and respiration are normal. Sometimes this continues for several days. One case of this nature, in my practice, crept around the yard eating grass and apparently well in every way, for a week, in spite of every effort to make her arise. Finally one morning the family found her walking around as natural as ever. This animal had been on a strychnin treatment during the entire time she was unable to rise. When this condition is met medical treatment seems of little use and mechanical methods no better, although it is well to continue the strychnin treatment. You may try for an hour or two to make a patient of this kind arise, and fail, leave the barn for half an hour, and return to find her up and acting as though nothing had happened. Upon examination of these cases after they had arisen I have never noticed any muscle atrophy or other condition that would lead me to believe that any pathological condition had caused the animal to remain down longer than the usual length of time. It is probable that muscular weakness is in a measure responsible for the condition.

In closing I will say that I have never seen a case in a primipara or following other than a normal birth, and never a case with retained placenta that the membranes were at all firmly attached to the cotyledons.

Many cows suffer attacks each succeeding year; others never have a second attack, and some suffer an attack every other year. I recall treating one family cow four times in eight years. Each time the animal presented a well-developed case of parturient paresis, the peculiar incident being that she was attacked every second year.

No case is too far gone to respond favorably to proper treatment unless the patient is dead upon arrival of veterinarian.

Due to the fact that the cause is still unknown, nothing has been successfully done along the lines of prophylaxis.

(NOTE.—Discussion of this paper will appear in the next issue of THE JOURNAL.)

STRONGYLIDOSIS IN THE HORSE

By C. H. COVAULT

Associate Professor of Veterinary Medicine, Iowa State College,
Ames, Iowa

STRONGYLIDOSIS is a febrile, enzootic disease of horses and mules which is characterized by enteritis, progressive emaciation and anemia, and caused by certain of the nematodes belonging to the family Strongylidæ. The disease is seen only in young animals from three months to five years of age, though the parasites are seen in horses of all ages. The condition has been described under the names sclerostomiasis and strongylosis, but the foregoing term seems preferable in the light of our present knowledge of the etiology of the disease.

In the State of Iowa alone, hundreds of young horses have died from this disease in the past few years, and information reaching us indicates that the losses are as severe in other States and that it occurs in most of the States of the Union. It is especially prevalent in the States of the Mississippi Valley, having been reported from Minnesota to Louisiana. It has been reported from the Southern States and as far west as Montana. We can see no reason why the disease should not be found in all portions of the United States where young animals have access to wet, swampy pastures, as it is from such that infestation occurs.

While our knowledge of the etiology of this disease may be lacking in certain details, we know that it is caused by certain nematodes of the family Strongylidæ, hence the name strongylidosis. Of the many parasites revealed by postmortem examination of animals dead from strongylidosis the most constant offenders and of first importance are the three species of the genus *Strongylus*, namely, *S. vulgaris*, *S. edentatus* and *S. equinum*. These three have been classified as belonging to the genus *Sclerostomum*, hence the name sclerostomiasis. Furthermore, both *Strongylus vulgaris* and *S. equinum* have been designated as *S. armatus*.

¹ Presented at the fifty-seventh annual meeting of the American Veterinary Medical Association, Columbus, Ohio, August, 1920.

It is from the standpoint of the practicing veterinarian that this discussion is entered into and I feel safe in saying that it is seldom that the practitioner so familiarizes himself with these parasites as to enable him to identify the different species, but the genus can usually be determined with a fair degree of accuracy.

The strongyli, being blood-suckers, vary in color from a pale pink to either a bright or bluish red depending upon the amount of blood they contain. They vary in size from $\frac{1}{4}$ to $2\frac{1}{2}$ inches in length and from the size of a thread to one-sixteenth of an inch in thickness, the size depending upon the age, sex and species.

Probably the most common companions of the strongyli are the various species of the genus *Cylicostomum*, considered by many investigators in the past as being one and designated by some as *Cyathostomum tetracanthum*, by others as *Strongylus tetracanthus*, and by still others as *Sclerostomum tetracanthum*. It has been determined, however, that the small, threadlike white worms seen in such great numbers and commonly referred to as tetracanthus and as belonging to some one of the three genera just mentioned represent in reality at least twenty-two species of the genus *Cylicostomum*. In addition to these, Looss recognizes one species of the genus *Æsophagodontus*, *Æ. robustus*; five species of the genus *Triodontophorus*, *T. serratus*, *T. minor*, *T. brevicauda*, *T. intermedius* and *T. tenuicollis*, and two species of the genus *Gyalocephalus*, *G. capitis* and *G. equi*. The part played by each of these in producing the disease is not known, but the greater part of the damage done is attributed to the three strongyli.

It is quite generally believed that the life histories of the various genera of the family Strongylidæ herein mentioned are much the same. The adult parasites inhabit the intestinal lumen, where they lay eggs, which are voided with the feces. Under favorable conditions of temperature and moisture embryos are developed after a very few days. The embryos moult one or more times, and after moulting are very resistant and will live six to eight months in moist manure or in water. These embryos are taken into the digestive tract of the host with contaminated food or water, and either finish their life cycle in the lumen of the bowel or encyst themselves in the intestinal mucosa or sub-

mucosa until sexually mature, when they emerge, copulate and repeat the life cycle. When burrowing the embryos sometimes pass through the wall of the intestine and become encysted beneath the serous membranes or in the lungs, liver or pancreas, or they enter the blood vessels. Larvæ of *Strongylus vulgaris* are commonly found in the mesenteric arteries or their branches, where they produce thrombosis and aneurisms. They have occasionally been found in the pulmonary, uterine and iliac arteries or their branches, where they produce thrombosis and aneurisms. They have occasionally been found in the pulmonary, uterine and iliac arteries, where they produce like lesions. Larvæ of *S. edentatus* are commonly found beneath the serous membranes, and those of *S. equinum* are commonly found in internal organs. It was formerly taught as a part of the life history of *S. vulgaris* that the larvæ developed in the blood stream until reaching a form resembling the adult, though without sex organs; at this stage it detached from the aneurism, passed to the walls of the cecum, where it became encysted; later the cyst opened into the lumen of the cecum, setting free the sexually mature worm. It is now believed by many that the larvæ in the blood vessels arrive there through accident and while they may reach sexual maturity do not reproduce.

The injury to the host is probably due to the combined effects of the mature and immature worms. The constant irritation of the blood-sucking adults together with the irritation from the encysted larvæ leads to a chronic thickening of the intestinal wall, with a resultant loss of function, leading to digestive disturbances, as evidenced by diarrhea, etc. This hindrance to absorption from the intestinal tract, together with the loss to nutrition through the blood-sucking parasites, as well as the loss to the host from the absorption of nutriment from the intestinal lumen by those parasites not bloodsuckers, rapidly depletes the system of the undeveloped host, leading to emaciation and anemia.

It is the belief of the writer that the presence of larvæ in the mesenteric vessels has little or nothing to do with the disease in question. It is true that this accident sometimes produces death through thrombosis and embolism, but clinical experience and postmortem findings do not indicate that this process operates to any extent in the production of the symptoms characteristic of

the condition which we term strongyloidosis or sclerostomiasis; therefore, consideration of thrombo-embolic colic does not seem advisable in this discussion. The mechanical injury to the intestinal mucosæ by the adults and immature parasites opens up paths for infection leading to local or metastatic abscess formation or enlargement and infiltration of the mesenteric lymph glands, resulting in an edematous condition of the intestine, or it may result in general infection hastening death. Likewise, death may result unexpectedly from peritonitis and septicemia through the rupture of a subperitoneal abscess.

Another factor, possibly of great importance in the production of symptoms and death, is the effect upon the host of toxins liberated by the parasites under certain conditions. In outbreaks where losses have been extensive and where deaths have been sudden and unexpected we have been unable to attribute the losses to any cause other than an intoxication. Postmortem examination in such cases revealed no changes other than those in the intestinal wall, and no symptoms had been manifested until a few hours preceding death. It is known that many of the other parasites infesting the intestinal tract liberate toxins having a marked effect upon the host. With reference to the toxicity of the strongyli the following abstract from the *Journal of Agricultural Research* is of interest:¹

This is a biochemical study of the parasite *S. equinum*. From the results it is seen that this organism contains fats, fatty acids consisting chiefly of butyric acid, soaps, mucin, albumoses, purin bases and creatin, a ptomaine, a crystallizable alkaloid, an amino acid, and an amorphous substance containing a nonprotein nitrogen and phosphorus which gives the precipitating reactions for an alkaloid. The cuticle of this parasite was also found to contain a unique protein combination which has no relation to chitin.

Contrary to the findings of Weinberg, an alcoholic extract of the parasite was found to possess a strong hemolytic power. The soaps, fatty acids, crystallizable alkaloids, and ptomaines were active in the hemolytic process. The parasite further secretes a lipase which is capable of digesting the fat contained in horse serum. This lipase, according to the author, plays an active role in hemolysis. The bilirubin of horse serum is changed by the cellular activity of the parasite.

Upon autopsy of the usual fatal cases of strongyloidosis one is attracted by the markedly emaciated, anemic cadaver. Often there is edema of dependent portions. Upon opening the abdominal cavity, cysts containing the larvæ, small abscesses re-

¹A chemical study of *Sclerostomum equinum*. T. Bondouy. Arch. Par. 14 (1910), No. 1, pp. 5-39.

sulting from these, or nodules resulting from the healing process are noted beneath the peritoneum. Often small hematomata are noted in the peritoneum. The mesenteric lymph glands are sometimes enlarged, and the subperitoneal tissue in such cases shows an edematous infiltration with an amber-colored fluid. The walls of the cecum and large colon are thickened and sclerotic and contain cysts and abscesses. The mucosa shows innumerable small red spots due to the piercing of the mucosa by the blood suckers and is thickly studded with small reddened elevations which contain larvæ. Ecchymotic hemorrhages are commonly present in the different coats of the small intestine. The lumen of the intestine usually is filled with a wriggling mass of parasites, millions of them being present free in the lumen and mixed with the ingesta and great numbers attached to the mucosæ.

The embryos are ingested by the host during the late spring and summer and sometimes produce symptoms of disease as early as November or December. Usually in our locality the cases are called to the attention of the veterinarian during the first four months of the year, though it may be much later, and as seen by him can be divided into two classes, the difference in the two being only in the extent of development of the symptoms. The interval between the ingestion of the embryos and the appearance of the symptoms as well as the severity of the symptoms depends upon the extent of the infestation and the resistance of the individual, the latter being determined largely by the feed and care the animal receives.

Upon those farms where the feed and care of the colts is given proper attention, or in herds where the disease has previously existed and the owner is alert, the veterinarian is called early and given the history that the colts are unthrifty in spite of proper care and judicious feeding. If any of the affected animals happen to be used for work it is further reported that these tire easily. Upon examination one finds signs of malnutrition, rough hair coat, leathery, harsh skin, and fair or poor condition of flesh. Quite commonly local sweating is observed, especially in the region of the flanks. Pulse, respiration, temperature, mucous membranes and appetite appear normal. Feces are usually normal, but in some cases there are indications of an intestinal catarrh, the feces being of softer consistency and malodorous, with the peristalsis active.

The second class of cases is characterized by the severity of the symptoms and are most often met with on those farms where the growing animals are allowed to "rough it" through the winter months, *i. e.*, feed in the cornstalk pasture with little or no shelter. They also occur under the best of hygienic conditions where the infestation is great or where for any reason the individual resistance is not marked. There is usually a history that the animal has lost flesh and strength rapidly; has a profuse diarrhea and marked thirst; appetite normal, increased or variable. The principal symptoms are extreme emaciation, weakness and exhaustion. The hair coat is rough, bones prominent and the eyes sunken. The visible mucosæ are anemic and often edematous. Peristaltic sounds are loud, and a watery, fetid diarrhea persists which soils the tail and buttocks. If the patient is seen when still able to walk it is noticed to have a staggering gait especially noticeable in the hind legs. Often the veterinarian is not called until the animal is recumbent from weakness. The pulse is weak, thready and irregular, often intermittent. Edema of dependent portions is frequently present. The temperature is normal except where elevated from secondary infection. Where daily temperatures are recorded in the febrile cases the fever is found to be irregular or intermittent. In recumbent patients areas of decubital gangrene are seen.

The course varies from two weeks to two months from the first appearance of symptoms, the variation being due to the factors mentioned as determining the character of the symptoms together with the extent of bacterial invasion of the traumatic lesions and the location and character of the accidental lesions produced by the larvæ.

In the first class of cases the prognosis is good providing proper curative measures be early inaugurated. In the advanced cases the prognosis must be guarded, since the mortality rate is sometimes very high. Death is usually due to exhaustion following a prolonged, progressive emaciation and anemia. It must also be borne in mind that death may come earlier from any of the following:

(a) Thrombosis of the mesenteric arteries.

(b) Peritonitis, due to intestinal perforation at the site of a verminous cyst or from rupture of a subperitoneal abscess.

(c) General infection taken up through the traumatic lesions in the intestinal mucosæ.

(d) Septicemia from decubital gangrene following great weakness.

(e) Internal hemorrhage from the rupture of an aneurism.

Furthermore, recoveries are often incomplete, it being impossible for the severely injured intestinal wall to resume its normal functions. The walls are thickened, the circulation impeded, the mucosa contains much scar tissue, and absorption is interfered with permanently so that nutrition is impaired. There is chronic indigestion with constant or intermittent diarrhea, the appetite is capricious and emaciation persists.

Diagnosis is not difficult in districts where infestations are common. Features which lead to suspicion are: History of the patient having pastured on low, poorly drained or marsh land, or having been sufficiently exposed to animals known to have been infested; the enzootic character; the season of the year at which the symptoms appear; the gradual intensification of the symptoms as already outlined. Of especial diagnostic importance is the finding of the worms in the feces. When diarrhea is present the worms are easily seen in the freshly voided feces, or if the arm is inserted into the rectum the worms will be seen on the hand and arm when it is withdrawn. Errors are not uncommon in cases where diarrhea is not present. The feces contain few or no worms. Rectal exploration may fail to reveal their presence. Where the history and symptoms indicate an infestation the diagnosis should be withheld until a purge has been administered and a reexamination made during the period of purgation, when in positive cases the parasites will be found in great numbers. It must be remembered that these parasites can be present in an individual without producing disease, so that the mere finding of the parasites is not of sufficient importance to exclude the necessity of further careful physical examination. In our locality laymen who have had previous experience frequently make a diagnosis and call at the office asking to have their colts treated for "little red worms." In those districts where infectious anemia exists the two diseases can be easily confused. It is reported that in infectious anemia there is a gradual increase in the temperature from day to day which might assist in the differentiation.

Treatment consists primarily in attempts to remove the parasites and to build up the resistance of the patient. To remove the parasites from the intestinal tract we prefer a combination of tartar emetic and ferrous sulphate, 1 to 2 drams of the former and 2 to 4 drams of the latter, the dosage depending upon the age, given daily in capsule or on a small amount of feed until six doses have been given. This we prefer to give in the morning before feeding. Unless the severe diarrhea or the weakness of the patient forbids, this six-day treatment should be preceded and followed by a purge. For this purpose aloes is to be preferred. Leneveu recommends 2 to 5 drams of carbon bisulphide given in capsule for five days and followed on the sixth day with a purgative, preferably magnesium sulphate. Turpentine in oil at intervals of three or four days has also given fair satisfaction. Thymol in ounce doses given after a period of fasting has, according to our limited observation, given only fair results. Oil of chenopodium given in from $\frac{1}{2}$ to 1 ounce doses following 24 to 36 hours fasting and followed by an aloes purge is said to give good results.

At the time of our first visit we administer 20 to 30 grains of atoxyl or 30 to 45 grains of sodium cacodylate intravenously, and repeat this dosage in ten days to two weeks. Rarely a third dose is given at the same interval. Where recovery is delayed we repeat the administration of tartar emetic, ferrous sulphate and sodium cacodylate after three weeks.

While the great value of the preparations of organic arsenic can not be denied, there is some difference in opinion as to how the beneficial action is exerted. It is stated that when given subcutaneously or intravenously they destroy the mature worms in the intestinal tract. Also that repeated doses destroy the encysted larvæ. The marked improvement following their use leads one to suspect that this may be true. It has been particularly emphasized that the marked improvement is due to the destruction of the larvæ in the blood stream, and while this action probably takes place, and if so is of value in the end, it is difficult to believe that their destruction could have any appreciable effect on the course of the disease under discussion. Leneveu recommends sodium cacodylate because of its alterative tonic effect, and it is possible that the beneficial results come as a result of this action.

Further tonic treatment consists in the administration of strychnine and inorganic arsenic in proper dosage. To allay intestinal irritation and control the diarrhea, salol, bismuth subnitrate or precipitated calcium carbonate should be administered.

Attempt to combat heart weakness with subcutaneous injections of camphor in oil or digitalis may be used per os.

Complications must be treated as they appear. Decubital gangrene should be guarded against in the weakened patient by the use of slings.

Marked weakness or threatened collapse is combated by the subcutaneous injection of from 1,000 to 2,000 mils of sterile normal saline solution.

Of first importance is the allowance of a generous diet, and this phase of the treatment can not be overemphasized.

In addition to the dietetic and medicinal treatment, prophylactic measures must be inaugurated to prevent infestation. Attempts should be made to secure proper under-drainage of all marsh land. Horses should be kept away from poorly drained pastures and care should be taken that the hay be free from contamination. The drinking water should come from deep wells or should be filtered. Infested animals should be isolated and their quarters frequently cleaned and disinfected and provided with clean bedding.

Livestock improvement, sectional in many cases, has advanced rapidly during the past two years through the influence of the nation-wide purebred sire campaign. Horsemen in the mid-western horse-producing States have perhaps said less about their attainments than their cattle-breeding brothers, but they have been plodding along, getting their results just the same. — *Breeder's Gazette*.

They were in a railway train and were discussing Dickens. "Well," said one, "John puts 'Bleak House' first and 'Martin Chuzzlewit' second." "Excuse me, gentlemen," said a husky voice from the seat behind. "I don't know your pal, John, but you're being steered. There ain't no such horses runnin'." — *Fort Worth Star-Telegram*.

BOTULISM IN SWINE AND ITS RELATION TO IMMUNIZATION AGAINST HOG CHOLERA

By ROBERT GRAHAM

Professor of Animal Pathology and Hygiene, University of Illinois, Urbana, Ill.

THE pathogenic significance of secondary bacterial invaders in hog cholera has been a subject of investigation since the development and application of the Dorset, McBryde and Niles anti-hog-cholera serum and virus treatment. Notwithstanding the reduced mortality from hog cholera due to the widespread use of anti-hog-cholera serum, the loss in swine immunized against hog cholera has yet been a heavy drain upon the swine industry. Beginning in 1918 bacteriological investigations of swine diseases occurring in Illinois were projected at the University Laboratory of Animal Pathology. The outbreaks coming within the scope of these investigations may occur following the administration of anti-hog-cholera serum and virus (one week to 90 days), and untreated young pigs on infected premises may frequently be chronically afflicted. The possible relation of the serum and virus treatment to the losses in question has been suggested, though the exact connection of same has long been a matter of conjecture.

The disease in question is marked by gross pathological changes in affected animals, which include a hemorrhagic inflammation of the lymphatic glands with petechial hemorrhages in the serous and mucous membranes when accompanied by hog cholera. An interstitial pulmonary edema with catarrhal pneumonia and pleuritic adhesions may be observed in some cases. The intestinal wall is thickened in the early stages of the enteric type of the disease, while circumscribed necrotic spots are visible on the serous covering of the intestine. In cases of long standing diffuse areas of diphtheritic gastro-enteritis have been encountered. The latter lesion is more commonly observed in young pigs. The heart, kidney, and liver show varying degrees of parenchymatous degeneration.

In etiologic studies a filterable virus test for hog cholera has generally revealed the presence of a low-grade hog-cholera virus, providing the animals have been previously immunized

against cholera. In a few untreated herds, where the disease may assume a more chronic course, the filterable virus of hog cholera could not be consistently demonstrated by the usual methods. Since the virulence of hog-cholera virus is diminished by filtration, the negative results are subject to further study before final conclusions are formulated.

Bacteriological studies of tissues from afflicted animals in 30 spontaneously affected herds frequently revealed the presence of *Bacillus suispestifer* and related organisms of the paratyphoid group, while *B. necrophorus* was demonstrated in certain local lesions together with extraneous Gram-negative and positive spore-bearing rods. The latter tinctorially and morphologically resembled *B. botulinus*, while subsequent cultural, toxogenic and serologic tests confirmed the identity of this microorganism. One or more afflicted pigs were submitted from each herd. Ninety per cent of the outbreaks were related to *B. botulinus* type A. Moreover, *B. botulinus* type A has been frequently encountered in the surface soil of many of the infected premises.

The syndrome observed in affected animals may vary in intensity, depending upon the age of the animal and the presence or absence of hog cholera. In mildly affected animals following immunization, weakness or stiffness in the hind legs with knuckling of the pasterns may be noted. Unthriftiness and drooping ears followed by a variety of nervous manifestations appear. Muscular twitching of the tail is observed in some animals. Occasionally a typical case of posterior paralysis or gluteal neurasthenia may develop. The breathing in advanced cases may be shallow with or without a thumping movement in the flank. Dyspnea and nasal catarrh give rise to a wheezing sound during inspiration. Conjunctivitis with a muco-purulent discharge may prevail in some animals and the eyelids become firmly glued together. Visual disturbances are commonly observed independent of inflammatory changes in the conjunctiva.

The sporadic syndrome briefly described may be reproduced by injecting hog-cholera serum and virus with varying amounts of botulinus toxin, while toxin injected per se in young pigs results in unthriftiness and malnutrition, with enteric and pulmonary disturbances analogous to those observed in pigs on naturally infected premises.

The not infrequent occurrence of the disease or diseases referred to above throughout the Corn Belt following immunization against hog cholera suggested its probable relation to the serum and virus treatment. In order to obtain bacteriological evidence on this point seventy-four samples of commercial hog cholera serum and virus were examined with special reference to anaerobic flora. Many different species of anaerobes were encountered, but it seemed significant that 16 per cent of the samples purchased in the open market proved positive to *B. botulinus* type A. Of this number 10.8 per cent of the positive samples were hog-cholera virus, and 5.2 per cent were hog-cholera serum. The serum and virus samples included in this series were in many instances of the same serial number employed in the treatment of herds that developed illness subsequent to immunization, and it is presumed from the preliminary evidence that a higher percentage of the commercial anti-hog-cholera serum and virus is contaminated with toxogenic strains of *B. botulinus* type A, while the possible significance of other pathogenic anaerobes has not as yet been eliminated from consideration. The possibility of botulism in sick herds following hog-cholera immunization should not be disregarded, though the filterable virus of hog cholera has been demonstrated in a majority of outbreaks.

In the light of bacteriologic and serologic tests it is apparent that hog cholera is the predominating disease in post-vaccination illness in swine. The incubation and development of cholera in recently immunized herds in our judgment may be traceable to the fact that the serum and virus treatment is simultaneously superimposed upon a specific botulinus intoxication which lowers the resisting powers of the animal and permits the development of a latent and low-grade cholera.

Aerobic pathogens such as *Pasteurella suisepitica* and several unidentified saprophytes in the tissues of afflicted animals do not appear to be a significant or primary factor in the losses. In fact the administration of bacterins prepared from the hemorrhagic septicemia group have been found not only worthless, but detrimental in preliminary experiments. On the contrary the injection of botulinus antitoxin type A in so-called "breaks" following immunization, in preliminary trials under field conditions, is highly efficacious, providing hog-cholera virus infection

is eliminated or subjected to control by the administration of a second dose of anti-hog-cholera serum.

The logical procedure to be tentatively recommended in avoiding loss subsequent to immunizing hogs with commercial anti-hog-cholera serum and virus as at present prepared, consists of a prophylactic injection of botulinus antitoxin (500 units) to offset the specific intoxication which may be produced by the use of serum and virus, until a better means is devised to eliminate all possibility of infected serum and virus. Furthermore, the relation of a food intoxication which might result from contaminated rations fed incident to immunization further justifies this prophylactic treatment. On infected premises pigs should be treated before symptoms of unthriftiness and malnutrition appear, since the curative effects of the antitoxin are limited. Chronic cases which at autopsy show well-organized secondary and nonspecific lesions of enteritis are amenable only to early treatment with botulinus antitoxin. On the contrary, bacterins of the hemorrhagic septicemia group, sometimes recommended in the treatment of such conditions, have proven detrimental in preliminary experiments.

Dr. L. M. Buffington has been transferred from the Government tick-eradication force in Arkansas to hog-cholera work in Iowa.

Dr. W. M. MacKellar, who for some time has directed the Bureau tick-eradication work in Georgia and Florida, has been transferred at his own request and assigned to the position of inspector-in-charge of field work and hog-cholera control in California, with headquarters at Sacramento. Dr. S. J. Horne assumes the duties formerly performed by Dr. MacKellar, with headquarters at Atlanta, Ga.

Doctors J. R. Wirthlin and A. M. Kirkpatrick have resigned their positions on the tick-eradication force of the Bureau of Animal Industry in Georgia.

Dr. Edward Horstman, of the Federal tick-eradication force, has been transferred from Louisiana to Georgia.

Dr. George M. Paxton is now acting inspector-in-charge of this work in Louisiana.

A TRIBUTE TO DEAN W. HORACE HOSKINS

By WILLIAM HERBERT LOWE

Paterson, N. J.

FORTY years ago William Horace Hoskins was graduated from the American Veterinary College, New York City. He was then twenty-one years of age, possessed of an indomitable will and a high purpose. He had learned how to study and had been inspired to greater things. It was at the feet of Liautard and his confreres that Hoskins commenced his notable career.

Ability, industry and loyalty were outstanding characteristics of the man. He was a remarkable leader in the profession. As an organizer, local, State and national, his achievements are unparalleled in the annals of the veterinary profession in America.

In the upbuilding of the American Veterinary Medical Association, which organization has become the largest and most influential veterinary association in the world, Hoskins played a most conspicuous part. He served the association as secretary for a time and later as president for a term of three consecutive years. He enjoyed the unique distinction of never having missed attendance at an annual meeting of the American Veterinary Medical Association and also of the Alumni Association of his Alma Mater, during the entire forty years of his professional activity.

From the day of the organization of the Federal Bureau of Animal Industry, in 1884, until the day of his death, he was a pillar of strength to that great department of our national government.

The present high status of the veterinary service in the United States Army is the result of twenty-five years of arduous labor on the part of our deceased brother who was largely instrumental in placing an act of Congress on the statute books in 1916, providing for commission and rank for veterinarians in the United States Army.

To recount his great work in his native State of Pennsylvania would be a task beyond the limits of the present hour. Leonard Pearson and W. Horace Hoskins were indeed a team

that has not been matched since the death of the former and great were the achievements for the University of Pennsylvania and for the Commonwealth.

Dr. Hoskins served the State Board of Veterinary Medical Examiners of Pennsylvania as secretary and executive officer for sixteen consecutive years. He was honored with the presidency of the Pennsylvania State and Keystone Veterinary Medical Associations, and also held the professorship of veterinary jurisprudence in the University of Pennsylvania for many years. He was an honorary member of the veterinary associations of a number of States, also of other scientific and fraternal organizations.

Our brother distinguished himself also in the field of journalism. He became editor-in-chief of the *Journal of Comparative Medicine and Veterinary Archives*, the lamented Rush Shippen Huidekoper being his associate in his editorial work.

Dr. Hoskins was a convincing and brilliant public speaker and has been referred to by his friends as the "silvered tongued orator" of the profession.

He was not a laboratory man or research worker, but he had the faculty, developed to a remarkable degree, of being able to appropriate and utilize the discoveries made in the laboratory to the advancement of the profession and the uplift of mankind.

A biographical sketch of Dr. Hoskins has been given a place in "Who's Who in America" and also in "American Men of Science."

Four years ago, upon the death of Dean William J. Coates, Dr. Hoskins succeeded to the Deanship of the New York State Veterinary College at New York University, whereupon he moved from Philadelphia to New York. His wonderful work here is so recent and familiar to us all as not to need review at this time, but let it be recorded that in placing veterinary education at its birthplace on this continent upon a more substantial and enduring basis than it had previously occupied, he performed a Herculean task which has been highly commended by true lovers of a noble profession.

Dean Hoskins is survived by his wife Annie E. (née Cheever) and a daughter, Mrs. Margaret E. Hofstetter of Philadelphia; also two sons, Dr. H. Preston Hoskins, Detroit, and Dr. Cheston M. Hoskins, Philadelphia, both of whom are veterinarians, and

seven grandchildren. He is also survived by a brother, Professor J. Preston Hoskins of Princeton University. We would extend loving sympathy to his family in their bereavement.

He was a God-fearing man of splendid character, respected and esteemed. The foundation stone of his monument is already built in this college, which was so dear to his heart. The veterinary faculty of New York University has lost its distinguished Dean and the veterinary profession of the State, the Nation and the world, one of its strong men.

A London cable to the *Philadelphia Ledger* says: "The royal commission appointed to consider the removal of the embargo upon Canadian store cattle, or cattle for slaughtering purposes, reported September 15 that the removal would tend to increase the meat supply of the country and lower the price. The report expresses the opinion that Canadian cattle are healthier than Irish cattle or British cattle. As to the danger of diseased cattle crossing the border from the United States into Canada, the commission says: 'There is no record of anything of the kind at any time. Canadian cattle are all branded with distinctive marks, and with ordinary care there is little chance of United States cattle being sent to this country as Canadian cattle.' "

American Hereford Journal says: "The purebred-sire campaigns carried on by Federal and State authorities, livestock associations and breed papers have shown to the farmer the value of purebred sires in their herds, and have created a desire for ownership. Now that the prices of good sires are greatly reduced, these desires can be gratified. The way is prepared and the field is large."

Dr. J. W. Etheridge, who has been on hog cholera work in North Carolina, has resigned from the service of the Bureau of Animal Industry, effective September 15.

Dr. F. H. Schleich, formerly of the Federal hog cholera force in Tennessee, is now doing meat inspection work at Chicago, Ill.

EXPERIMENTS TO DETERMINE THE VALUE OF CHICKEN-POX VACCINE¹

By FRED BOERNER, JR., and E. L. STUBBS

Philadelphia, Pennsylvania.

THE EXPERIMENTS herein recorded were carried out by the Pennsylvania Bureau of Animal Industry, first, as the result of numerous inquiries from poultrymen regarding the value of chicken-pox vaccine or bacterin, and second, of our failure to find anything in the literature which could be considered as conclusive proof that such products were valuable and worthy of recommendation. The works of Manteufel (1), Hadley and Beach (2) and Mack and Records (3) fail to furnish the proof that we desired.

Since the beginning of our work Beach (4) has reported further investigation upon this subject. He found that a vaccine was valuable as an adjunct to other remedial measures. One experiment was cited in which 168 diseased fowls were vaccinated and given local treatment, and a like number left as controls which were given local treatment but not vaccinated. Of the vaccinated the mortality was 19.6 per cent and of the controls 39.9 per cent. The average number of days required for recovery of the vaccinated fowls was 10.8 and of the controls 13.7.

He further states that the vaccine is designed for and chiefly used as a preventive, and following experiments carried out in California in 1914 its use was recommended to commercial poultrymen. In one year over 300,000 birds were vaccinated in California with vaccine prepared by Beach. A series of experiments was cited in which 1,026 healthy fowl were used, 900 vaccinated and 126 left as controls. They were then exposed to infection, with the result that 11 per cent of the vaccinated and 86 per cent of the controls became infected.

Beach's method of preparing the vaccine is different from that of previous workers in that only scabs are employed, these being obtained from artificially infected fowl. The scabs are

¹ Presented at the fifty-eighth annual meeting of the American Veterinary Medical Association, Denver, Colo., September 5-9, 1921.

thoroughly dried and then powdered. One dram of the powder is diluted with 100 mls of physiological salt solution, and of this 1 mil represents the amount to be injected.

Our first attempts to prove the value of chicken-pox vaccine were carried out during the spring of 1920 in two large, badly infected flocks. The vaccine was prepared according to the method employed by Hadley and Beach and which was also used by Mack and Records. The heads of badly affected chickens were brought to the laboratory, where the scabs from combs and wattles, the pseudo-membranes from mouth and throat and the cheesy collection around the eyes were removed, finely minced and triturated with a small amount of normal salt solution. The mass was allowed to macerate in the ice-box over night. It was then filtered through cotton, diluted with salt solution, and finally heated to 58° C. for one hour.

EXPERIMENT NO. 1.

The farm, located in York County, Pennsylvania, was visited March 17, 1920, at which time the flock was found to be badly infected with chicken-pox and the mortality high. The owner stated that it was the first outbreak of its kind he had had and that the flock had been suffering from it the greater part of the winter. He was willing to allow us to vaccinate a portion of the flock and leave the remainder as controls. Heads showing marked lesions were collected and brought back to the laboratory for the preparation of the vaccine.

As shown in Table 1, the birds were kept in four houses, numbered respectively 1 to 4. In houses 1 and 2 there were three pens each, designated by the letters A, B and C, while houses 3 and 4 contained but two pens each.

During the week following the original visit all the fowls in house No. 2 and one pen in house No. 3 and one pen in house No. 4 were vaccinated. One pen in each of houses 3 and 4 were left as controls. On this same date one pen in house No. 1 was given a second injection, and on April 1 one pen in house No. 3 was injected the second time.

In the course of the experiment the owner kept records of the number which died in the various pens and a record of the egg production for 21 days subsequent to vaccination.

On May 19 we visited the premises and found a marked im-

provement, there being but few birds affected. The control pens appeared to be in as good condition as the others.

We have summarized the results in Table 1, a study of which can allow but one conclusion, and that is that the vaccine was not demonstrated to be of any value. The best control we had was in case of house No. 4, where the number of affected and healthy birds were in about the same proportion in both pens and the results were practically the same in both, whether vaccinated or not.

It is to be noted that in house No. 1, pen C, and house No. 3, pen A, where the fowls were given two injections, the mortality was very much higher. This was probably due to the fact that these two pens were in bad condition when first treated, having a larger number of affected birds than the other pens. The high mortality also influenced the egg production per hen.

TABLE 1.—RESULTS OBTAINED IN EXPERIMENT NO. 1.

House	Pen	Number affected	Number healthy	Date of first vaccination	Date of second vaccination	Mortality subsequent to vaccination	Per cent mortality subject to vaccination	Egg production 30 days	Eggs per hen
1	A	44	57	Controls	Controls	12	11.8	1,527	14--
	B	50	22	3-20-20	.....	11	15.2	993	13+
	C	63	35	3-20-20	3-27-20	30	30.6	737	7--
2	A	45	58	3-27-20	.....	9	8.7	2,460	13+
	B	16	52	3-27-20	.....	10	14.7	.....	.....
	C	12	77	3-27-20	.....	5	5.6	1,343	15+
3	A	67	23	3-27-20	4- 1-20	55	61.1	811	9+
	B	26	69	Controls	.....	25	26.3	1,166	13+
4	A	20	65	Controls	.....	12	14.1	1,051	12+
	B	29	59	3-27-20	.....	10	11.3	1,095	12--

* Mortality includes all deaths from March 20 to May 19.

EXPERIMENT NO. 2.

This flock was located on a farm in Luzerne County, Pennsylvania. The disease appeared during the month of April. On May 13 we visited the farm and arranged with the owner to vaccinate a portion of the flock and collected material for the preparation of vaccine.

On May 20 we returned prepared to carry out the treatment. The flock was kept in eight different houses, and of these three were picked as being the worst affected and were selected for treatment. Each bird was injected subcutaneously with 1 c.c. of the vaccine. The houses which contained those treated were

No. 3, in which 178 were healthy and 333 affected; No. 4, with 82 healthy and 99 affected; and No. 6, with 136 healthy and 200 affected. Those in houses 1, 2, 5, 7 and 8 were left as controls.

The results of this experiment are shown in Table 2, and it is to be noted that the mortality for three weeks subsequent to vaccination was about one-half that for the three weeks prior to vaccination in both groups. This warrants the belief that the use of the vaccine in this outbreak certainly did no harm, but it is questionable if it was of any value as a means of checking the disease. The egg production was practically the same in both groups.

TABLE 2.—MORTALITY AMONG FOWLS IN EXPERIMENT NO. 2.

House No.	Weeks Ending 5-8-20	5-15-20	5-22-20	5-31-20	6-8-20	6-15-20	6-23-20	Total
1	5	42	25	13	3	9	8	105
2	1	9	13	10	1	1		35
3*	14	15	39	25	3	2	8	106
4*	8	6	19	14			1	48
5	1	2	3	5			9	21
6*	9	28	39	29	1	3	2	112
7		2						2
8	1	1	2		2		4	10

* All fowls vaccinated May 20, 1920.

TABLE 3.—SUMMARY OF RESULTS OF EXPERIMENT NO. 2.

House No.	Number of Fowls	Treatment	Mortality for the 3 weeks ¹ prior to vaccination		Mortality for 3 weeks ² subsequent to vaccination	
			Number	Per cent	Number	Per cent
1	373	None	72	16.18	25	6.97
2	490	"	23	4.48	12	2.44
5	589	"	6	1.00	6	.98
7	632	"	2	.31		
8	408	"	4	.97	2	.49
Total..	2,492	.....	107	4.11	45	1.80
3	438	Vaccinated	68	13.43	30	6.84
4	181	May 20, 1920	33	15.42	14	7.73
6	335	"	75	18.29	34	10.15
Total..	954	.....	176	15.57	78	8.17

¹ Percentage based on number of fowl in flock on April 30, 1920.

² Percentage based on number of fowl in flock on May 20, 1920.

EXPERIMENT NO. 3

It was not until the following winter that an opportunity was afforded for the continuance of this work. Beach having reported his results during the summer, it was decided to employ the same vaccine that he recommended. Sufficient virus for this work was purchased from the University of California. The

vaccine was prepared from this virus and injected according to the method recommended by Beach.

The first flock in which this vaccine was used was in Delaware County, Pennsylvania. The disease had appeared on this farm in the winter of 1919-20. During the fall of 1920 a few cases developed, but the disease did not spread. The manager was able to control it by local treatment. The fact that these cases developed without a tendency to spread led us to question the diagnosis. Inoculation experiments were carried out and it was found that the disease could be readily transmitted. In November the fowl were housed and by the first of December the manager informed us that the disease was spreading rapidly and he was unable to control it. Arrangements were made to carry out an experiment in one of his houses. This house was divided into five pens. The two end pens, A and E, and one-half of the middle pen, C, were vaccinated December 7, 1920. Pens B and D and one-half of C were left as controls. No treatment other than the vaccine was attempted. On December 14 pen A was injected the second time.

Each fowl was leg banded, thoroughly examined, and a record made of its condition at the time of vaccination. They were all carefully examined on December 20 and again on January 3.

TABLE 4.—RESULTS OF EXPERIMENT NO. 3.

Description	Condition	Observation 12-7-20	Observation 12-20-20	Observation 1-3-21
Pen A,* vaccinated twice	Healthy.....	46	47	34
	Affected.....	32	29	40
Pen B, controls	Healthy.....	46	41	23
	Affected.....	34	39	51
Pen C,* vaccinated	Healthy.....	16	19	15
	Affected.....	19	12	19
Pen C, controls	Healthy.....	18	22	13
	Affected.....	19	12	19
Pen C, controls	Healthy.....	18	22	13
	Affected.....	19	15	24
Pen D, controls	Healthy.....	51	47	35
	Affected.....	25	29	39
Pen E,* vaccinated	Healthy.....	52	52	32
	Affected.....	21	21	41
SUMMARY: Vaccinated	Healthy.....	114	118	81
	Affected.....	72	62	100
Controls	Healthy.....	115	110	71
	Affected.....	73	83	114

*Vaccinated 12-7-20.

Table 4 shows the condition of both the vaccinated birds and the controls on the above-mentioned dates.

It will be noted that the disease remained practically stationary for the first two weeks following vaccination. During the second two weeks it increased, as shown plainly in the summary of results. It would appear at first glance that the vaccinated fowl showed some resistance, as on January 3 there were 81 healthy in the vaccinated lot against 71 healthy in the controls. A second glance, however, will show that there were more cases developed between December 20 and January 3 in the vaccinated lot than in the controls.

The mortality in this flock was relatively low and is of little value in determining the effects of the vaccine. The following is a record of all deaths from December 7, 1920, to June 1, 1921:

Vaccinated birds.....	Pens A, C and E, 21
Controls	Pens B, C and D, 32

These numbers include all deaths, many of which were due to intestinal disturbances. During the spring enteritis was quite prevalent in this flock and was the cause of death in many instances. The number of those which died showing lesions of chicken-pox was: Vaccinated birds, 11; controls, 7.

EXPERIMENT NO. 4

Experiment No. 4 was carried on at about the same time as No. 3 and on a farm situated in the same county. The data are given in Table 5, from which it will be seen that the infection appeared in two houses, Nos. 1 and 2, in which there were nine pens in all, and in six out pens.

The three columns give the conditions as found at the three different dates, it being understood that such pens as were vaccinated were vaccinated December 10, 1920.

It is to be observed that at the time of the first observation a certain number of birds, those vaccinated, and the controls, were both affected and healthy. At the time of the second observation there had been a marked improvement, the number of infected birds being markedly fewer. At the time of the third observation, conditions had grown worse, which may probably be credited to an intervening spell of bad weather.

At the time of the third observation the condition with regard to the controls was much as it had been originally, while there

TABLE 5.—RESULTS OBTAINED IN EXPERIMENT NO. 1.

Description	Condition	(Observation) 12-10-20	1st Observation 12-29-20	2nd Observation 1-12-21
HOUSE NO. 1:				
Pen A,* vaccinated	Healthy.....	35	61	61
	Affected.....	38	12	12
Pen B, controls	Healthy.....	36	47	42
	Affected.....	21	10	16
Pen C,* vaccinated	Healthy.....	29	40	36
	Affected.....	20	9	13
Pen D, controls	Healthy.....	18	35	39
	Affected.....	35	18	14
Pen E,* vaccinated	Healthy.....	28	43	34
	Affected.....	19	4	13
Pen F, controls	Healthy.....	29	40	29
	Affected.....	17	6	17
HOUSE NO. 2:				
Pen A,* vaccinated	Healthy.....	56	58	41
	Affected.....	7	5	22
Pen B, controls	Healthy.....	84	82	42
	Affected.....	5	7	47
Pen C,* vaccinated	Healthy.....	57	54	50
	Affected.....	6	9	13
OUT PENS:				
No. 1,* vaccinated	Healthy.....	10	20	21
	Affected.....	13	3	2
No. 2, controls	Healthy.....	10	14	17
	Affected.....	12	8	5
No. 3,* vaccinated	Healthy.....	14	16	17
	Affected.....	8	6	5
No. 4, controls	Affected.....	12	18	14
	Healthy.....	9	17	17
No. 5,* vaccinated	Affected.....	15	7	7
	Healthy.....	12	17	15
No. 6, controls	Affected.....	9	4	6
	Healthy.....	12	17	15
SUMMARY:				
Vaccinated	Healthy.....	238	309	277
	Affected.....	126	55	87
Controls	Healthy.....	201	253	198
	Affected.....	107	55	110

* Vaccinated 12-10-20.

was an improvement with the vaccinated birds. It is somewhat questionable, however, if this was due to the vaccination. If so, it was not sufficient to be of practical value, as neither the egg production nor the mortality was favorably influenced. In this experiment but two birds died, one of which had been vaccinated and the other had not. These were not listed in the table. Egg production, recorded from December 9, 1920, to January 11, 1921, inclusive, was as follows:

Vaccinated fowl	8.38 eggs per hen
Controls	8.25 eggs per hen

DISCUSSION

These flocks were carefully selected as showing good typical lesions of chicken-pox, not complicated with lesions which might be confused with other diseases of chickens.

In each flock there were numerous cases of small wart-like epithelial tumors on the comb, wattles or skin of the head, and these lesions are accepted by most authorities as diagnostic of chicken-pox. In addition to these external lesions there were also many diphtheritic areas or caseous and cheesy areas in the mouth, on the tongue and in the throat. All birds were handled at the time of vaccination and at each examination to determine the general condition and marking, the degree of affection of the comb, wattles, face, mouth, tongue and throat.

In all the tables the birds marked affected showed either the small wart-like epithelial tumors known as external lesions or the diphtheritic or caseous areas on the tongue, in the mouth or in the throat. Those marked healthy are birds which were in good physical condition and showed no lesions of any kind.

In Experiments 1 and 2 the disease had been present for some time, and if all the birds had been treated it might have led us to think that they were benefited by the treatment. The disease entirely disappeared from each of the premises and up to the present time has not been found again. In Experiments 3 and 4 if all had been treated and no physical examinations made it might have seemed that the disease had been checked.

It is our hope to do more work along these lines, for up to the present time the results of our experiments, which were of fair magnitude and conducted in the field, do not confirm the results obtained by other investigators. In our hands the vaccine recommended and produced by Beach has apparently not been of practical value in controlling chicken-pox. It is of course possible that further studies will necessitate some modification of our conclusions, but since the whole matter is one of considerable importance, we felt that we were justified in presenting the results already obtained. We further hope that other investigators may be stimulated to carry on similar experiments, so that absolutely definite conclusions may be reached as to the value of this product.

The authors wish here to express their appreciation to Dr. George H. Hart, of the Veterinary School, University of Pennsylvania, for the valuable assistance given them in connection with Experiments Nos. 3 and 4.

LITERATURE

1. MANTEUFEL. Arb. Kaiserl. Gesundh., 33 (1910), 305.
2. HADLEY and BEACH. Proc. Amer. Vet. Med. Assoc., 1913, p. 704.
3. MACK and RECORDS. Bul. 82, Agr. Expt. Sta., Univ. of Nev., June, 1915.
4. BEACH. Jour. Amer. Vet. Med. Assoc., vol. 11, No. 3, p. 301.

ANIMAL EXPERIMENTATION, THE DOCTOR AND THE DOG

(From an article entitled "In the Time of Henry Jacob Bigelow," by William J. Mayo, M. D., Rochester, Minn., in *Journal of the American Medical Association*, August 20, 1921.)

JENNER on a certain occasion presented arguments which were capable of being proved, but which he had not proved. The following day John Hunter wrote to Jenner saying, "Why submit hypotheses? Try it on a hedgehog and know." Animal experimentation has resulted in gifts of inestimable value to humanity. The pernicious activities of antivivisectionists seriously threaten the continuance of these investigations, which are of such paramount importance to the nation's health. It is of interest to note that in the last election in California the antivivisectionists, aided by various organized cults, such as Christian Science, osteopathy and chiropractic, were defeated two to one by a referendum directly to the people, a triumph of an appeal to reason. The defeat of the antivivisectionists was owing in a great measure to the sagacity of Dr. Ray Lyman Wilbur, President of Leland Stanford University. The people, the farmers in particular, were shown what animal experimentation has accomplished in the prevention of disease to farm animals, what it has accomplished for the canning industry in relation to botulism, and the possible effect on economic conditions in California if the work should be discontinued.

It is undoubtedly true that much of the opposition to animal experimentation among reasonable persons has been brought about by a few careless physicians. For at least four thousand years the dog has been man's friend and companion, and the

occasional buying of stolen family pets at small prices for animal experimentation, as has been done in some laboratories, has alienated the public. The physician should not be a fence for stolen property, and his complicity can not be glossed over by saying that he did not know the property was stolen. The physician has no more right to a stolen dog than to a stolen purse. All these difficulties could be overcome by a proper law which would turn vagrant dogs over to accredited institutions. At the present time thousands of homeless dogs, many times more than the number used in all the laboratories of the United States, are killed at the pounds of the various cities, often by methods entailing more pain than any experiment carried out in a controlled laboratory, and are an economic loss except so far as their hides and fat can be used for commercial purposes. Some methods should be devised whereby these animals, or as many as necessary, may become legally available for the use of recognized, responsible laboratories for experimental work.

Moreover, the medical profession in the past has been derelict in permitting untrained men to perform animal experimentation without supervision. It was such experimentation that roused the resentment of a great many persons. If it is the wish of the medical profession to continue this work, its members must not furnish a market for the thief and they must protect the dog from the untrained experimenter. Fortunately, the organized physicians of the country have already made considerable progress in controlling the conditions of animal experimentation from within. Regulations which place upon laboratory directors responsibility for the importance of the problems studied and for the propriety of the procedures used in the solution of these problems have been formulated and adopted by corporate vote in medical institutions throughout the land. By pursuing the policy of honesty and faithfulness to a trust, animal experimentation can be carried on without serious objection. Experiments on animals were performed in Bigelow's time, but today such investigation has become one of the foundation stones of progress.

Dr. Emlen Wood has resigned from the position of Assistant State Veterinarian of South Carolina, and has started practice at Greenwich, Cumberland County, New Jersey.

CLINICAL AND CASE REPORTS

(Practitioners and others are invited to contribute to this department reports of unusual and interesting cases which may be helpful to others in the profession.)

PYOSALPINGITIS AND THE SURGICAL TREATMENT THEREOF

By G. E. JORGENSEN

Ulermont, Iowa

Patient.—A four-year-old purebred Jersey cow.

History.—Had been bred and conceived when at the age of three years, the pregnancy terminating in parturition after a normal and uneventful duration. The birth, however, was quite pathological, presenting both a maternal and fetal dystokia as follows: There was present an anterior presentation in the dorso-pubic position with a lateral deviation of the head in the right ilio-cephalic position with both front feet engaged in the pelvis. Repulsion and version corrected this, and delivery of a live, well-developed calf followed. This calf developed acute enteritis and pneumonia within twenty-four hours in spite of the fact that it was not allowed to receive any nourishment and had been given several enemas to clean out the digestive tract and one dose of calf-scur serum. It died in two days. Cultures from the lungs and intestines showed two streptococci, one of the *viridans* group and the other a green-producing, hemolytic, long-chained variety.

The cow revealed extensive placentitis and metritis with retained placenta and considerable uterine discharge. No attempt was made to irrigate the uterus, but instead capsules containing zinc oxide and iodoform were placed deeply within its cavity every three days. In seven days the placenta was removed, and the uterus showed enough involution in four days thereafter so that it could be douched and the fluid siphoned out. After about four weeks' treatment the uterus and cervix were so nearly normal that the patient was discharged from treatment.

Three months after parturition I was called to see her again for the reason that she had shown no signs of estrum. Vagi-

nal examination revealed a normal cervix firmly contracted, with no signs of any inflammation or discharge. Rectal examination revealed a cystic corpus luteum in the left ovary. It is an established fact that cystic degeneration of the corpus luteum indicates an infection of the oviduct at time of rupture, which points to tubal infection on the side where present. Hence, for fear that rupture of the cyst at this time would further infect the adjacent tissues, treatment was confined to a careful dilatation of the cervix and irrigation of the uterus with normal salt solution. A small amount of flocculent muceo-pus was siphoned out. Irrigations were carried out once a week for three weeks, at which time the writer was called away and was absent for three weeks. Upon his return the patient was examined and showed an extensive enlargement of the left tube with considerable adhesion of the pavilion to the ovary. The right ovary was normal, as was the tube as far as palpation could indicate. A diagnosis of pyosalpinx was made, and as the breeding efficiency of the animal was nil in the present condition, surgical interference was advised, cause for such action being based upon the radical treatment of pyosalpinx in women. The operation was carried out as follows:

The animal was given 1½ ounces of chloral after being dieted for twenty-four hours. One hour after the administration of the chloral the animal was secured in the stocks in such a manner that it could not lie down, and an area twelve inches in diameter on the left side was shaved and cleansed in the usual surgical manner, after which an incision was made through the skin and underlying fascia down to the abdominis externus as far back as possible and about eight inches in length. Following this the external abdominis obliquus was divided in the direction of its fibers, while the internal was incised with the scalpel in the same direction as the external. The left tube and as much of the cornua as could be brought out were then exposed through the incision and the ovary and tube freed from the suspensory ligaments. Following this the tube was clamped off at its uterine termination and severed from its attachment thereto, after which the stump was cauterized with pure phenol and a purse-string suture inserted in the serous coat and the tip

or stump pushed in, similar to the technique employed in an appendectomy on the human. The parts were then returned and the laparotomy wound sutured. The case made an uneventful recovery and is now pregnant.

Discussion.—Pyosalpinx is in the majority of cases bilateral. In fact, out of some forty cases seen by the writer this is the first one which appeared to be unilateral. If bilateral, surgical intervention is of course contra-indicated. In such cases it is better to leave the tubes alone and concentrate the treatment on the cervix and uterus in the hope that the tubal infection may not prove so severe that occlusion occurs. The writer has found that a cystic degeneration of the corpus luteum serves as a fairly constant indication to tubal infection, and this is corroborated by other writers. In this particular case there was a spread of infection by contiguity from the uterus to the tubes, and while the cervix and uterus appeared to be freed from infection and inflammation, there however did exist a chronic salpingitis and to a lesser degree pyometra. The chronic salpingitis terminated, as it occasionally does, in a tubal abscess. Sections of the uterine end of this tube revealed a complete destruction of the epithelial elements and a replacement with connective tissue, resulting in a complete occlusion of the tube, which extended to within two inches of the tubal abscess. This abscess involved the pavilion, which was entirely adherent to the ovary, which was involved in the abscess.

In this particular case there is another feature of interest. There was in this herd a chain of evidence running back to the bull. The bull came from a herd where genital infection had been rampant, and was finally discarded himself for the reason that he suffered from a partial sterility which gradually became absolute. Examination of this bull showed several pathological features, as follows: There was present an oligospermia. There were spermatozoa that showed various imperfections such as absence of tails, absence of nuclear membranes or atrophic nuclei and lack of motility, together with the presence of streptococci in the semen. Clinically an enlargement of the seminal vesicles and atrophic degeneration of the left testicle could be demonstrated. Autopsy on this bull later showed a chronic semino-vesiculitis and an atrophic degeneration of the testicles. Later it was learned

that this bull had suffered from scours during calfhood. The cow herein described had been bred to this bull and the calf born in dystokia and later dying from septic enteritis and pneumonia was its progeny. Cultures from the amputated tube showed the presence of streptococci similar to the cultures obtained from the bull and the calf.

There are two principal outstanding features in this case which serve as a motive for the presentation of this case report. First, an infection which can be traced back to the sire and from him to an infected herd where he originated, and later progressing in the form of an unbroken chain to a future generation, demonstrating the part played by the male in the transmission of genital infections and the ultimate chaotic results following in the dam and offspring. Secondly, that tubal diseases can be successfully controlled when unilateral, although such surgical intervention is very difficult due to the general inaccessibility of the genitalia in cows through laparotomy.

OLEANDER POISONING IN A BEAR¹

By W. J. RATIGAN

New Orleans Zoological Park, New Orleans, La.

SUBJECT—Black bear (*Ursus luteolus*), male, three years of age.

The animal was observed to be ill in the early afternoon on April 14. My office was notified but I was unable to get to the Park until nearly evening.

The bear was in considerable distress. The symptoms presented indicated a severe gastro-enteritis. The animal had vomited several times before I reached its quarters, and while I was in attendance it changed positions frequently and gave, as bears do, every evidence of marked abdominal pain, *i. e.*, lying upon the back with the limbs extended, attempting to procure relief by grasping with the paws anything within reach, etc., etc.

It is known down here that the bark and leaves of the oleander are toxic to animals. I couldn't account for this animal's con-

¹ Presented at the fifty-eighth annual meeting of the American Veterinary Medical Association, Denver, Colo., September 5-9, 1921.

dition in any other way than to lay the blame upon its ingestion of some of the leaves of this tree. The bark seemed undisturbed. The tree was a dozen feet from the cage. The following day one of the employees of the Park said he had seen a colored nurse, to amuse a child, pluck some leaves and place them in reach of one of the bears.

The animal showed slight improvement until the following noon when it became worse and died that evening.

Upon autopsy the stomach was found to be empty, its wall was considerably thickened and the mucous membrane was a slate or purple color. These changes extended into the duodenum, where several blood clots were found, indicating the previous hemorrhagic inflammation.

The following may be found in Law's "Principles and Practice," vol. 2:

DOGBANE FAMILY

In Apocynaceæ must be named the *Neurium Oleander* (a common house plant in the North and a garden or wild plant in the South and West). *Thevetia* and *Apocynum Andresæmifolium* (spreading dogbane) are most deadly acrid poisons to all kinds of stock. In my experience a horse cropping a few leaves of an oleander died in a few hours with violent gastro-enteritis. The dogbane is less poisonous when dried in hay.

The Pasteur Institute at Paris produced during the period of the war about eight million doses of serum of various kinds, according to an interesting article reviewing the work of the Institute during the war, by Dr. A. Calmette, assistant director, in the *Revue d'Hygiène*. The American Army and the American Red Cross received 800,000 doses. At the time of the German offensive in March and April, 1918, the Institute was able to furnish 20,000 vials of antitetanic serum per day.

Sigma Xi, the honorary scientific fraternity, accepted Dr. Leonard W. Goss of the Veterinary Department, Ohio State University, as an initiate at its recent meeting. Membership is based upon accomplishment and promise in the field of science.

Dr. P. W. Loob, who has been engaged in Federal hog cholera work in Kansas for over a year, has recently been transferred to Iowa on the same class of activities.

ABSTRACTS

VACCINATION AGAINST STRANGLES. René Van Saceghem. Ann. Méd. Vét., vol. 66 (1921), p. 100.

After referring to the seriousness of the malignant epizootic form of strangles affecting horses at army remount depots, and after reviewing briefly the work of other investigators, Van Saceghem describes a method of vaccination which has been tried in a preliminary way with good results in the Belgian Army and which is being introduced on a large scale in that army.

The vaccine is made of a two-days' culture of the streptococcus of strangles on bouillon, heated to 56° C. for half an hour. The streptococcus employed is a culture isolated from pus from affected horses at the remount depot for which the vaccine is intended. Before being used the vaccine should be tested by making cultures to make sure that it contains no living organisms. The vaccination consists of three subcutaneous injections, the first of 5 c.c. and the others 10 c.c. each, eight days apart. The first injection always gives a greater local reaction than succeeding ones. The thermic reaction rarely exceeds one degree (Centigrade). Old horses show a much milder local and thermic reaction than young horses. This may be accounted for by a natural immunity of the older horses. Horses already affected with strangles, especially those convalescing, show no local reaction. The horses vaccinated by this method have not contracted the disease in the midst of heavy infection.

The vaccine not only possesses preventive immunizing powers, but is also curative. After injecting subcutaneously repeated doses of 10 c.c. into horses gravely affected with strangles a manifest therapeutic action has been observed. In all cases the vaccine influenced very favorably the course of the disease.

PARATYPHOID OF THE HONEY BEE. L. Bahr. Skandinavisk Veterinar-Tidsskrift, vol. 9 (1919), pp. 25-60.

In the digestive tract of bees affected with a severe intestinal diarrhea the author found a type of bacteria which he classified as belonging to the paratyphoid group of bacilli and to which he gave the name "*Bacillus typhosus alvei*." The disease manifested itself in producing in these animals slight paralytic

symptoms and diarrhea, which was exceedingly infectious. In a few days a considerable number of bees were affected, the mortality being about 50 per cent. The organism, with few exceptions, could be recovered in pure culture from the intestinal tract of infected bees, and it is said in some instances from the blood. The organism is characterized as rod-shaped and has a certain biological and morphological similarity to the typhoid bacillus, but it is not identical with that occurring in man. The disease can easily be transmitted to healthy bees by feeding them with pure cultures of the bacillus. In concluding his investigations, the author lays particular stress upon measures for the eradication of the disease, particularly in controlling the purchase and sale of hives and queen bees.

J. P. O'LEARY.

SEPTICEMIC INFECTION IN LAMBS CAUSED BY THE BACILLUS OF SWINE ERYSIPELAS. M. Christiansen. *Maanedsskr. Dyr-løger*, 31 (1919), No. 12, pp. 141-254. Abs. in *Exp. Sta. Record*, vol. 44 (1921), p. 583.

This is a report of post-mortem examination made of a lamb 38 hours old in a flock in which there had been a very high mortality among the lambs, revealing hemorrhagic enteritis, great enlargement of the mesenteric glands, degenerative changes in other organs and small hemorrhages under the endocardium and epicardium. Small bacilli present in pure culture were found to represent the swine erysipelas bacillus. It is stated that no case of swine erysipelas in pigs had occurred at the farm during the time of the outbreak among the lambs.

COMPLEMENT FIXATION IN BOVINE TUBERCULOSIS. C. Hruska and W. Pfenninger. *Ann. Inst. Pasteur*, vol. 35 (1921), p. 96. Abs. in *Amer. Rev. Tuberc.*, vol. 5 (1921), p. 98.

The antigen of Besredka fixes alexin in the presence of serum of tuberculous cattle. In the sera of 304 known tuberculous cases, 84.5 per cent positive reactions were recorded. Of 90 sera where tuberculosis was not demonstrable at necropsy, 2.2 per cent reacted positively. Where tuberculosis was not advanced (glandular only) the percentage of positive reactions was 60 per cent. Where the involvement included lungs, pleura, peritoneum and some of the abdominal viscera, the reaction

was 85 to 95 per cent positive, and when the disease was generalized all sera reacted positively. The method should be an important diagnostic aid in bovine tuberculosis.

EXCRETION OF TUBERCLE BACILLI IN BILE. A. C. Marchisotti. *Semana Méd.*, vol. 28 (1921), p. 37. Abs. in *Amer. Rev. Tubere.*, vol. 5 (1921), p. 98.

Marchisotti found the liver often affected in tuberculous cattle. Healthy milk can thus become readily contaminated by droppings from tuberculous cattle, or the apparently healthy cow herself may be voiding tubercle bacilli by way of the stools. His research was done on cattle slaughtered for the market and thus supposedly healthy, the tuberculous lesions being a necropsy surprise. Human urine and stools are liable to transmit the tubercle bacilli as readily as sputum. Tuberculosis of the liver should be classed as open tuberculosis on this account. Tuberculin tests do not reveal the involvement of the liver in particular.

TUBERCULOSIS IN SMALL RODENTS. A. Boquet and L. Negre. *Ann. Inst. Pasteur*, vol. 35 (1921), p. 142. Abs. in *Amer. Rev. Tubere.*, vol. 5 (1921), p. 99.

The experiments recorded confirm the statements of previous authors such as A. Koch, Rabinowitsch, De Jong, Weber, Bofinger, Straus, Romer and A. S. and F. Griffith, that white rats and mice are susceptible to infection with tubercle bacilli, human, bovine and avian types, but are so resistant to small doses that they cannot replace the guinea pig or rabbit in experimental work. Intraperitoneal inoculation of 1 to 2 mgm. offers the surest means of producing infection, which is manifested chiefly by the formation of tubercles in the lungs, and by the intense multiplication of bacilli in the liver and spleen. Intracutaneous inoculation in the ball of the foot occasionally provokes extensive, severe lesions. Infection is favored in general by the introduction of repeated small doses. Only rarely is tuberculosis infection fatal to rats and mice. The three types are of about equal virulence. Inoculation of the bacillus of Arloing and bacilli of the piscine types does not cause infection. Infected animals are not very susceptible to tuberculin. The phenomenon of Koch is not observed.

DIAGNOSTIC VALUE OF TUBERCULIN IN HUMAN SURGICAL TUBERCULOSIS. C. Mau. *Deutsch. Ztschr. Chir.*, vol. 161 (1921), p. 145. Abs. in *Amer. Rev. Tuberc.*, vol. 5 (1921), p. 110.

Ninety-nine patients were tested first with the Pirquet test and, if positive, with 1, 5 and 10 mgm. of O. T. subcutaneously. Conclusions: 1. A positive focal reaction is obtainable in only two-thirds of cases of surgical tuberculosis. Closed cases react more frequently than those with fistulae or abscesses. Occasionally a certain case of tuberculosis reacts focally but not constitutionally. Healed cases do no longer give a focal reaction. 2. A focal reaction which is only subjective must be accepted with great caution. 3. If all tuberculin tests are negative, tuberculosis can be excluded with certainty; if temperature and focal reactions are absent, but the puncture reaction is positive, tuberculosis can be excluded with great probability, or healing can be assumed to have taken place. 4. An absent focal but positive temperature reaction does not speak against tuberculosis. In these cases the onset and cause of the temperature may have a limited diagnostic value. 5. The tuberculin test, carried out systematically and cautiously, is a valuable and harmless diagnostic help.

THE FRIEDMANN TREATMENT OF TUBERCULOSIS. M. Nathan. *Presse Méd.*, vol. 28 (1920), p. 819. Abs. in *Amer. Rev. Tuberc.*, vol. 5 (1921), p. 104.

The chief characteristic of the method is the inoculation of living acid-fast bacilli, isolated from a turtle. They are differentiated from human tubercle bacilli (1) by growing at a temperature between 13° and 42° C., (2) by producing miliary tuberculosis in cold-blooded animals, and (3) by being harmless for warm-blooded animals. Friedmann would classify them as a separate species, intermediate between the human and reptilian bacilli. Pierkowski and others dispute this claim, saying that they are human bacilli, accidentally infecting the turtle and becoming transformed gradually in its new host. Calmette states that Friedmann's cultures contain human as well as turtle bacilli. Friedmann maintains that his bacillus, while innocuous for man, will immunize against human and bovine infection, and supports his claim by animal experiment, but in 1912 he was more conservative than in 1904. Orth and Ehrlich could not con-

firm Friedmann's claims. Selter in a recent work was unable to prove the existence of antibodies following inoculation with the Friedmann organism and could not alter the course of disease in guinea pigs infected with human organisms by treatment with turtle bacilli. Friedmann has inoculated infants and caused positive skin reactions which later disappeared, but Selter in duplicating this work obtained negative results. Clinically, the method has been tried in surgical cases with contradictory results and no definite conclusions can be drawn at present. With pulmonary tuberculosis the results are also inconclusive and accidents have been reported from the use of this method. Some successes have been obtained, whether due to the method or not is a question, and most results are negative or doubtful and cases as comparable as possible have given different results. The writer concludes that Friedmann's case is far from being proved and time alone will decide. All new methods have produced transitory successes.

EFFECTS OF FILTRATION ON THE POTENCIES OF ANTITOXINS. W. N. Berg. Jour. Infect. Diseases, vol. 29 (1921), pp. 86-90.

The author wished to ascertain whether any antitoxic units were adsorbed when a product, such as tetanus antitoxin, was filtered through a Berkefeld type filter.

In filtration experiments with diatomaceous earth, protein was adsorbed from tetanus and diphtheria antitoxic products in quantities ranging from 5 to 33 per cent of the original protein content.

In experiments with fuller's earth, the protein absorbed was 4 to 78 per cent.

The conclusion reached was that there will be a detectable adsorption of antitoxic units if there is protein adsorption in large amount (20 per cent or more), while if protein adsorption is less than 20 per cent, there may be no detectable adsorption of antitoxic units.

As ordinarily carried out, filtration of an immune serum through a Berkefeld type filter does not result in appreciable losses of antitoxic units.

ARMY VETERINARY SERVICE

EXAMINATION FOR APPOINTMENT IN VETERINARY CORPS

The Surgeon General recently announced that an examination has been authorized by the Secretary of War for appointments to the grade of second lieutenant in the Veterinary Corps of the Regular Army. Not to exceed 16 appointments will be made as the result of this examination. The date is not fixed, but the examination may be expected to occur during the next three or four months.

These examinations will be held by boards of officers convened in the various corps areas and applicants should apply to the commanding general of the corps area in which they reside for circulars of instruction, announcement of the date and all other information.

Before authority to take the examination can be given it is necessary for each candidate to file an application for commission in the Regular Army on Form No. 88 AGO. This form may be obtained at any military post or station or from the Adjutant General, U. S. Army, Washington, D. C.

The information given in the application must include names of veterinary colleges attended, date of graduation, and satisfactory evidence of the required one year's experience in the practice of veterinary medicine or its equivalent in hospital work, or as an instructor in an approved veterinary college, or as an employee of the Bureau of Animal Industry of the United States Department of Agriculture actively engaged in veterinary professional work, subsequent to graduation, and a complete statement of military service, if any. The application must be accompanied by evidence of citizenship, if the applicant is of foreign birth, and by certificates, based upon personal acquaintance, from at least three reputable persons as to citizenship, character and habits. When completed, the application should be forwarded through military channels to the commanding general of the corps area in case the applicant is in the military service. All others may submit their applications directly to the nearest corps area commander or to the commanding officer of any nearby military post, camp or station.

Another requirement is that the applicant shall be a member of the Veterinary Reserve Corps at the time of taking the

examination. Consequently *prospective candidates who are not now enrolled in the Veterinary Reserve Corps should apply without delay by letter to the Adjutant General, War Department, U. S. A., Washington, D. C., for a commission in the Veterinary Reserve Corps, stating in the application that they desire to be so commissioned for the purpose of taking the examination for appointment in the Veterinary Corps, Regular Army.*

No candidate will be permitted to take the examination who will not at the probable time of appointment be between the ages of twenty-one and thirty years. The earliest limit of probable time of appointment may safely be considered as December 1, 1921.

The examination follows the general requirements of AR 605-20. This publication is not available for general distribution and the extracts therefrom given below will be found of value to candidates.

The policy of the War Department to require a preliminary examination, a period of observation of four months at the Medical Department Service School, and a final or qualifying examination has been waived for this examination and the preliminary and final examinations will be combined into one.

To be eligible to take the examination a candidate must be a male citizen of the United States. He must have a satisfactory general education, must be a graduate of an acceptable veterinary college legally authorized to confer the degree of Doctor of Veterinary Medicine, or its equivalent, and which requires students to have covered satisfactorily a four-years high school course, or its academic equivalent, as a minimum entrance requirement, and which maintains this course of instruction covering a period of four years of not less than seven months in each year. The applicant must also have had, subsequent to graduation, at least one year's experience in the practice of veterinary medicine, or its equivalent in hospital work, or as an instructor in an approved veterinary college, or as an employee of the Bureau of Animal Industry of the United States Department of Agriculture, actively engaged in veterinary professional work.

Each candidate must present to the examining board a diploma conferring upon him the degree of Doctor of Veterinary

Medicine, or its equivalent, or a certificate of graduation, which will be returned to the candidate when it has served its purpose.

The physical examination conforms to the standards prescribed by the War Department for officers of the Regular Army. Candidates cannot be accepted subject to the performance of operations for the removal of physical defects. Candidates are also examined and investigated for moral character, adaptability and fitness for the service.

The mental examination will be written. The subjects covered and the relative weight of each follows: Anatomy, 12; physiology and histology, 10; materia medica and therapeutics, including toxicology, 8; pathology, bacteriology and parasitology, 8; meat and dairy hygiene, 11; practice of medicine, 12; obstetrics and zootechnics, 5; chemistry and physics, 4; surgery (general, operative, dental and of the foot), 12; veterinary preventive medicine, including animal sanitation and management, 12; and horseshoeing, including pathological shoeing, 6.

The Veterinary Corps of the army was reorganized in 1920 and now presents an attractive career to the young civilian veterinarian to whom army life appeals. Commissions are granted in the grade of second lieutenant with eligibility for promotion to first lieutenant after three years' service, captain after seven years, major after 14 years, lieutenant-colonel after 20 years and colonel after 26 years. Veterinary officers receive the pay and allowance of all other officers of corresponding grades.

A hound dog went mad at Massapeag on July 11, and bit Mrs. A. M. Etheridge in the thigh, a man named Rogers, in one of his hands, and also bit a cow. The dog died later. The wounds on the man and woman were cauterized and they will be pasteurized as soon as possible.—*Norwich (Conn.) Record*.

The following question and answer from an examination for nurses is reported by a Pittsburgh physician to the *Journal of the American Medical Association*:

Question—How is certified milk produced?

Answer—The cows are milked by people who are dressed in white, kept in clean stables and put in sterile containers, then kept in a cool place.

ASSOCIATION NEWS

MISSOURI VALLEY VETERINARY ASSOCIATION

THE twenty-eighth annual meeting of the Missouri Valley Veterinary Association was held at the Hotel Rome, Omaha, Nebraska, July 11, 12 and 13. The attendance was excellent and good interest in the program was displayed.

The program opened with an address of welcome by James Dahlman, Mayor of Omaha; an old-time friend of our association, who extended to us the key to the city and offered his pardoning power in case any member was unfortunate enough to fall into trouble. Dr. J. S. Koen responded in a very fitting manner to this address.

The scientific program opened with a very complete series of reports by the Committee on Milk and Food Inspection, as follows: "Vitamines in Milk, with Special Reference to the Effects of Heat," R. F. Bourne, Fort Collins, Colo.; "The Milk Goat and Its Relation to Our Future Milk Supply," P. L. Cady, Arlington, Nebr.; "Organization of Food and Milk Inspection in Small Cities and Towns," G. H. Mydland, Horton, Kan.; "Feeding and Care of the Dairy Cow for Milk Production," W. H. Bailey, St. Joseph, Mo.; "Souring Bacteria in Milk, with Special Reference to the Aciduric Group," J. S. Barbee, Kansas City, Mo.

Among the notable features of these reports might be mentioned the lively interest manifested in vitamines as concerned with animal nutrition. Many interesting points were brought out in this connection, particularly along the line of paralysis in pigs and cattle, in which was included the so-called loin disease reported on by Dr. A. T. Kinsley, in a paper to be mentioned later.

The efficiency of the milk goat as a source of the family milk supply was well presented by Dr. P. L. Cady. He called attention to the fact that the goat, Polly Mae, produced twenty-nine times her weight in milk in 365 days, while Segis Prospect, a Holstein cow, holding the world's record for milk production, failed by 10,470 pounds of producing twenty-nine times her own weight in milk. The freedom of goats from tuberculosis and their adaptability to use on small premises were also emphasized.

Dr. J. S. Barbee in his report introduced some interesting data on the use of new strains of milk bacteria in the treatment of intestinal disorders in man.

The report of the Committee on Surgery was exceedingly valuable. Dr. H. E. Bemis discussed two methods of wound treatment; the first by the use of Dakin's solution; the second known as Morison's method, in which a paste known as "Bipp" is used. This paste consists of iodoform 16 ounces, bismuth subnitrate 8 ounces, liquid paraffin 8 ounces, or a sufficient quantity to produce a paste of the desired consistency. In using this paste, the area surrounding the wound should be cleaned, shaved and disinfected—all portions of necrotic material or other foreign matter removed, and the wound surface carefully sponged. The paste is then rubbed into the surface of the wound, the excess removed, the wound sutured or bandaged and left alone for 10 to 14 days. Various types of wounds are treated in this way, and healing occurs in a very satisfactory manner.

Dr. Bemis also called attention to a new method of preparing Dakin's solution from two stable stock solutions. These solutions are made by diluting 135 c.c. of the B. P. liquor calcis chlorinate to 750 c.c. and the making of a saturated solution of boric acid. Two hundred and fifty c.c. of this second solution added to the first gives one liter of Dakin's solution, known under the trade name of Eusol.

Dr. W. G. Gregory reported on the treatment of fistula following strangulated umbilical hernia. Following proper restraint and preparation of the fluid, he removes scar tissue around the fistulous opening, but does not disturb intestinal adhesions. The opening is then closed with heavy braid silk and the animal kept in a clean place for from 10 to 15 days, the wound being dressed with a mild antiseptic solution and laxative food being provided. Dr. Gregory reports a successful outcome in eight cases treated by this method.

Dr. R. C. Moore in a verbal report called attention to the frequency of rheumatism, obscure lameness and similar disorders resulting from focal infections which are easily overlooked. He believes diseased uteri may be commonly responsible for affections of this kind.

Reports by the Committee on Therapeutics gave some interesting data on a number of preparations in common use. The

following reports were rendered: Nux Vomica, R. C. Foulk, Holton, Kan.; Arsenic, E. H. Kartrude, Jasper, Minn.; Echinacea, A. Kaderabek, Fort Dodge, Iowa; Lobelia, P. C. Molgard, Ruskin, Nebr.; Digitalis and Serums, F. C. Carter, Sedalia, Mo.

Dr. W. T. Spencer, chairman of the Committee on Sanitation, called attention to the developing field of sanitation as a science and the thoroughness with which such work is being done when unhampered by politics and financial considerations. He emphasized also the great importance of thorough clean-ups following the removal of tuberculous animals from herds, stating that in Nebraska one veterinarian gives his entire time to this work.

Reports by Drs. B. F. Davis, B. W. Conrad and J. H. McLeod described conditions in their respective States relative to communicable diseases. Dr. Davis reported only one outbreak of hog cholera in Wyoming during the past year. Scabies has existed in cattle, sheep and horses, but is under strict supervision and is being rapidly eliminated. Dr. McLeod reported the inauguration of municipal food inspection service in his home city, taking effect August 1.

Dr. W. E. Muldoon read a very complete paper on dog distemper from a clinical standpoint. He stated that the specific cause of the disease has not been determined, although it is present in the catarrhal secretions of the mucous membrane and in most instances is taken into the body through food and water. He considers that various organisms are present as contributing factors in its causation, and that biologic products prepared from them probably have some value as prophylactic agents. His paper is well worthy of careful study when it appears in the veterinary press.

Dr. W. S. Ferrand reported his experience with the stomach tube in treating indigestion in the horse. He finds it a most valuable means of dealing with such disorders, if properly used. He employs a comparatively small caliber single-flow tube.

Loin disease in cattle as studied in the coast region of Texas was the subject of a report by Dr. A. T. Kinsley. The condition is a typical lumbar paralysis and affects range cattle grazing on prairie land, but not on river bottoms or timber land, so far as has been observed. No specific cause has been found, but in many respects the disease suggests deficiencies in the diet. The absence of water soluble B was suggested, and the

treatment with foods containing this vitamin seems to promise good results.

One of the most scholarly and valuable papers, entitled "The Veterinary Practitioner," was read by Dr. David S. White. He called attention to many of the achievements of the veterinary profession and presented his vision of its future field, emphasizing the need for unity, rendering of real service and the adaptation of methods of new problems.

Dr. J. I. Gibson presented a report of the progress made in Illinois by the welfare movement inaugurated by the State Veterinary Medical Association, of which he is field secretary. He makes a plea for thorough organization in each State, in order that the profession may present a united front in matters which concern the profession as a whole.

Dr. J. H. Lynch in an address entitled "The Veterinarian and Citizen," very forcefully expressed his views relative to the part which the veterinarian should play in the life of his community.

Prof. H. R. Smith gave some very interesting statistics in the control of tuberculosis in animals and man, which was followed by the showing of a two-reel motion picture prepared by the B. A. L. for exhibition to the public in the interest of tuberculosis eradication. Dr. Smith stated that 30 per cent of persons dying between the ages of 15 and 60 years die of tuberculosis and that one-third of human tuberculosis acquired before the age of 5 years comes from milk. He also states that 95 to 98 per cent of tuberculosis in hogs comes from milk or carcasses of affected cattle. In 1908, 2 per cent of the hogs slaughtered in Government establishments were retained for tuberculosis, while in 1920 nearly 11 per cent were retained.

The work of tuberculosis eradication is progressing satisfactorily, however, many applications cannot receive immediate attention because of the lack of men and funds to begin the work.

Following this paper, Drs. Hall and Morris of Omaha placed on display specimens showing tuberculous lesions in a horse, which excited great interest.

The entertainment features of the program were complete and enjoyable. The wives of members were admirably entertained and the usual show at the Ak-Sar-Ben was provided for men. The performance was one of the best which has been

our privilege to see, and many members could relate interesting episodes in which they played a leading part if they could be induced to do so.

The following officers were elected for the ensuing year:

President—P. L. Cady, Arlington, Nebr.

Vice-President—J. W. McGinnis, Ord, Nebr.

Secretary-Treasurer—R. F. Bourne, Fort Collins, Colo.

Trustees—S. W. Alford, Lincoln, Nebr.; L. U. Shipley, Sheldon, Iowa; B. W. Conrad, Sabetha, Kan.; A. T. Kinsley, Kansas City, Mo.; J. S. Koen, Bloomington, Ill.

The winter meeting will be held in Kansas City during the last week of January.

R. F. BOURNE, *Secretary*.

KENTUCKY VETERINARY MEDICAL ASSOCIATION

At the meeting of the Kentucky Veterinary Medical Association, held in Danville, Ky., July 6, 7 and 8, the following resolutions were adopted:

“Resolved, That we, the members of the Kentucky Veterinary Medical Association, do hereby express our sincerest appreciation and thanks to the Chamber of Commerce, Elks Club and the citizens of Danville for the most cordial reception in Danville; to the State Livestock Sanitary Board and the U. S. Bureau of Animal Industry for the able and efficient manner of controlling disease and offering assistance to the practitioner; to Drs. E. S. Good, W. S. Anderson, W. W. Dimock, M. Scherigo of the University of Kentucky; Dr. E. L. Quitman of Chicago; Dr. L. B. Ernest of Washington, D. C., and Dr. C. W. Fisher of Danville for the enlightening and instructive papers read at this meeting.

“Be It Further Resolved, That the secretary be and he is hereby instructed to send to each of the above organizations and individuals a copy of these resolutions, and that a copy be spread upon the minutes of this meeting.”

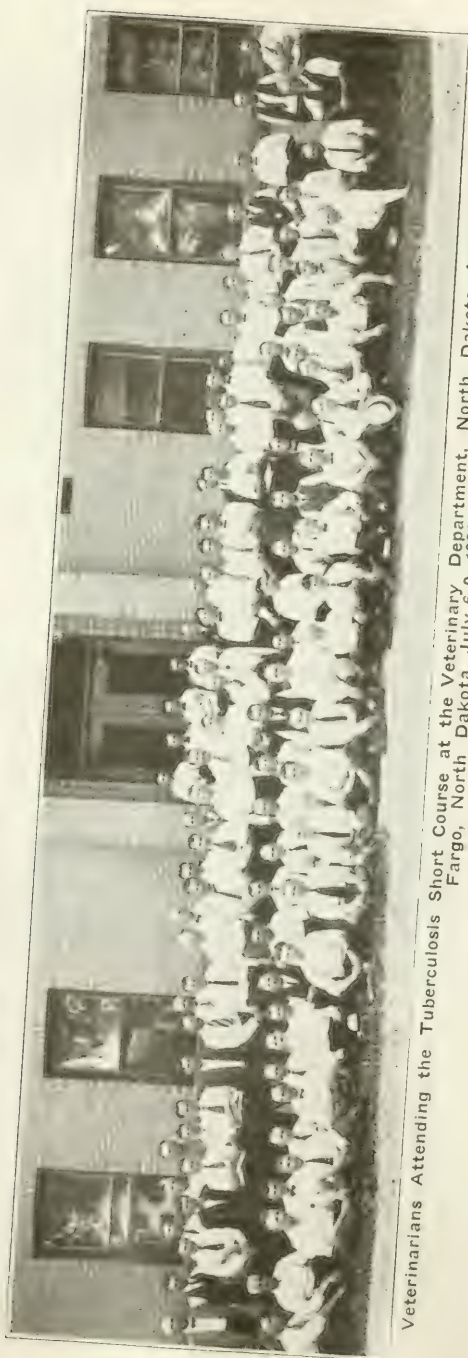
The meeting was a big success, over 100 members being present. Citizens of the town turned out to make us welcome. The Chamber of Commerce is made up of live members. The Farm Bureau entertained us with an auto ride in the country. Next meeting will be held at Owensboro, February 8-9, 1922. New officers will be elected at that time. Rising vote of thanks was given to Drs. E. L. Quitman and L. B. Ernest for interest shown us.

CHAS. W. FISHER, *Secretary*.

NORTH DAKOTA VETERINARY MEDICAL ASSOCIATION

On July 6 to 9 over 100 North Dakota veterinarians gathered at Fargo to attend a short course on tuberculosis. The course was presented by B. A. I. representatives, members of the North Dakota Livestock Sanitary Board and the faculty of the Veterinary Department of the Agricultural College. The work was carried out at the Veterinary Building of the college. Lectures and papers filled the forenoons while the afternoons were devoted to laboratory work and practical demonstrations of the various tuberculin tests, especially the intradermic test. A tuberculous herd of twenty-two animals was quartered in quarantine pens at the Veterinary Department and the technic of making the injections for the intradermic test and the making of observations were thoroughly worked out by each of the veterinarians present. Tuberculous swine and fowls were also available for the testing work. At the close of the course a number of the cattle, pigs and chickens were slaughtered and the technic of inspecting tuberculous animals was demonstrated by B. A. I. inspectors and the lesions carefully examined. Following the short course a Federal examination was given all men expecting to do accredited herd work and ninety veterinarians wrote papers. Dr. E. Lash of Washington, D. C., Dr. W. F. Crewe, North Dakota Livestock Sanitary Board, and Dr. A. F. Schalk, Inspector in Charge of North Dakota, Dr. C. H. Babcock, of the North Dakota Livestock Sanitary Board, and Dr. A. F. Schalk, Dean of the Veterinary Department of the Agricultural College, attended to the arrangements for the course and took prominent parts in its presentation.

Among the lectures delivered were the following: North Dakota laws, regulations and policies, W. F. Crewe; etiology, bacteriology and pathogenesis of tuberculosis, L. M. Roderick; the diagnosis of tuberculosis by the various tuberculin tests, C. H. Babcock; pathology and pathologic anatomy, L. M. Roderick; the preparation of tuberculins, R. E. Lubbehusen; Federal laws, regulations and policies concerning tuberculosis, H. H. Cohenour; relations between veterinarians and livestock owners, W. F. Crewe; tuberculosis in swine and poultry, A. F. Schalk; economic importance and clinical aspects of tuberculosis, R. S. Amadon; the relation of animal to human tuberculosis, Don Mc-



Veterinarians Attending the Tuberculosis Short Course at the Veterinary Department, North Dakota Agricultural College, Fargo, North Dakota, July 6-9, 1921.

Mahan; hygiene and sanitation in the control of animal tuberculosis, H. L. Foust; immunology in tuberculosis, A. F. Schalk; the significance of tuberculosis in meat inspection, C. Brady.

R. S. AMADON, *Secretary*.

WESTERN NEW YORK VETERINARY MEDICAL ASSOCIATION

The seventh semiannual meeting of the Western New York Veterinary Medical Association was held at Hamburg, N. Y., July 14. Dr. Edward Rafter had prepared a very interesting clinic consisting of cases for diagnosis and operation.

At 1.30 the association adjourned for lunch at Grange Hall, after which the business meeting was called to order by the President, Dr. F. E. McClelland.

Five new members were added to our number, which brings our membership nearly up to the seventy mark.

Dr. J. N. Frost of Cornell University gave a very interesting and instructive address on "Meningitis in Calves," which aroused considerable discussion.

A hatpin in the alimentary tract of a dog was the subject of a paper read by Dr. Chas. D. Blaser, Buffalo, N. Y. It also created considerable discussion and brought out reports of similar experiences among the other members.

The annual meeting will be held the second week in December at Buffalo.

F. F. FEHR, *Secretary*.

MONTANA VETERINARY MEDICAL ASSOCIATION

The Thirteenth Annual meeting of the Montana State Veterinary Association was held in Bozeman on July 29-30.

The association assembled at the Agricultural Building of the Montana State College. Prof. C. N. Arnett welcomed the association in behalf of the college and the City of Bozeman.

A clinical demonstration of Montana poisonous plants conducted by Prof. Swingle of the Montana State College, assisted by Drs. Marsh and Welch, featured the afternoon session.

In the evening the association met at the Three Bears Inn for its annual banquet. The horse problem in Montana was discussed by Prof. C. N. Arnett, representing the breeder's stand-

point; Dr. W. J. Butler, from an economical standpoint, and Dr. A. D. Knowles, from the standpoint of the veterinary practitioner.

On July 30, Dr. C. N. Arnett, assisted by Prof. Oscar Fretsven and Prof. Millin, gave a very interesting and instructive clinic on the principles of stock judging of beef cattle, horses, dairy cattle and sheep. This number was one of the outstanding features of the session.

Dr. Hadleigh Marsh gave a paper on the pathology of progressive pneumonia in sheep, assisted by a clinical demonstration of lesions by Dr. Howard Welch of Bozeman. Drs. Marsh and Welch have been doing considerable research work in this condition and much valuable information to the Montana practitioners is a result of their efforts.

Dr. B. T. Simms, of the Oregon State College, presented a clinical demonstration and discussion of sterility in cattle, assisted by Dr. Welch with a wealth of clinical material furnished by the Veterinary Department of the Montana State College. This interesting problem of the veterinarians was handled in a most thorough and painstaking manner by Dr. Simms and the association members can consider themselves extremely fortunate in having such an able demonstrator of this important economic condition of the livestock industry.

Professor W. F. Schoppe of the Montana State College concluded the program by a clinical demonstration and lecture on caponizing.

Election of officers for the ensuing year resulted in the choice of Dr. C. H. Stevens of Stevensville, President; Dr. O. L. Devore of Bozeman, Vice-President; Dr. Hadleigh Marsh of Helena, Secretary-Treasurer.

The meeting adjourned to meet in Billings in 1922.

N. GUNN, *Secretary*.

MARYLAND STATE VETERINARY MEDICAL ASSOCIATION

Through the energetic cooperation of the officers and members of the Maryland State Veterinary Medical Association, together with the officers of the Pennsylvania and West Virginia Veterinary Medical Associations, an interesting and enjoyable meeting took place at Mountain Lake Park, August 9 and 10.

There were present about fifty veterinarians from the three States. The program was largely surgical and the patients were furnished for the most part through the untiring efforts of our "human dynamo" member, Dr. George E. Melody, of Oakland, and most of the clinical demonstrations took place on his four-thousand acre farm, just below Deer Park.

The meeting was opened with an address by the President of the Maryland Association, Dr. R. F. Smith, of Frederick. He urged the importance of hearty cooperation upon all members in furthering the interests of the profession, in an endeavor to raise our standard throughout the State, and requested all present to assist him in obtaining for membership every graduate veterinarian in the State.

The clinical program was opened with demonstrations of the standing and the recumbent castrations, by Drs. Melody and Smith, respectively. Much interesting discussion arose as to the merits of each method. However, as the two operations were performed perfectly, the discussion is likely to continue indefinitely.

The next clinical case presented was an umbilical hernia in a hog, complicated by an intestinal fistula through the hernial sac. Radical treatment was decided upon and Dr. R. F. Smith was requested to operate. About eight inches of intestine were found necrosed and were excised and end to end entero-anastomosis of the small intestine was necessary. Although under ether for an hour and a half, the hog manifested immediate appetite upon returning to consciousness. Shortly thereafter, without any by-your-leave, and without waiting to call a taxi, the hog started for home and was not again located until the following forenoon, at which time he was quietly eating and seemed in fine spirit. Inasmuch as the owner promised Dr. Smith a ham, should the animal live, all present wished the hog well.

Two cases of lameness and a peculiar case of actinomycosis followed.

We then adjourned for lunch, which was provided at the top of the mountain on the estate, at an elevation of 3,500 feet. The comedy of the meeting was here supplied by Dr. Bryan, who endeavored to thrust an eight inch leg, properly clothed in pressed trousers, through a six inch opening in a barbed wire

fence. The fence was victorious and kind friends offered help in the shape of paint, lantern soot and other similar camouflages.

After lunch we enjoyed an address by Dr. T. E. Munce, State Veterinarian of Pennsylvania. He dealt mainly with the progress of the veterinary profession and its importance to the livestock industry of the country. The annual losses from preventable infectious diseases were graphically illustrated by figures.

Dr. Munce was followed by Dr. J. A. Kiernan, chief of the Division of Tuberculosis Eradication, Bureau of Animal Industry. In a brilliant address Dr. Kiernan reviewed the work and accomplishments of the veterinary profession of America, with special reference to the eradication of animal scourges. He described how contagious pleuro-pneumonia still rages in some parts of Europe and would be still prevalent in this country but for the united efforts of the veterinary profession. His statement that the Kingdom of Holland spent twenty million dollars last year in a more or less unsuccessful effort to "control" foot and mouth disease and that Spain had appropriated twenty-five million for the same purpose, surprised his audience. This justified his conclusion that although the American veterinary profession has been severely criticized for its ruthless slaughter of affected animals, nevertheless foot and mouth disease had been completely eradicated from our borders at a much less cost than either of the countries previously mentioned spent in efforts to merely prevent its further spread.

The remarkable results of the efforts of the Bureau of Animal Industry to rid the South of Texas fever were next ably described. It was shown that only a small percentage of the originally affected area remained to be cleaned.

Dr. Kiernan concluded his remarks by a discussion of the all important subject of tuberculosis eradication. Perhaps the most surprising statement was that "at least 50 per. cent of all the milk consumed in the United States was not pasteurized." Another statement of interest to all was that three-quarters of our States had shown a relatively small percentage of reactors among the cattle tested by the Bureau and that it would, therefore, be a relatively easy matter to eradicate the disease from these areas in a short time. Although the remaining 25 per cent of the area of our country was rather badly infected, neverthe-

less tuberculosis could be and will be eradicated from all areas in the United States in time.

Later in the afternoon clinics were again opened with a case of immense ventral hernia in a cow. The case was deemed inoperable and Dr. Melody performed the flank operation for ovariectomy and Dr. R. C. Reed, Chief, Division of Animal Industry, Maryland State Board of Agriculture, spoke for a time of the manipulation of the ovary direct and through the rectal walls.

In the evening all members attended the moving pictures at the Auditorium, where, in addition to several thrilling reels, we had exhibited the Bureau of Animal Industry film: "Out of the Shadows," a tuberculosis picture in story form.

On Wednesday we again met at Dr. Melody's farm. A post-mortem was held on the cow with the large ventral hernia, demonstrating the hernial ring and the content of the sac. Dr. T. A. Ladson, inspector in charge of tuberculosis eradication for Maryland, and Dr. John J. Muller, of the State force, then completed the postmortem by demonstrating the lymph glands usually affected by tuberculosis.

The great treat of the meeting came when Dr. John W. Adams, Professor of Surgery, University of Pennsylvania, demonstrated the operation for roaring, with correct methods for anesthesia. The years seem to treat Dr. Adams most kindly and he simply excelled himself, more than which could not be said of any member of our profession.

Dr. Ladson, assisted by Dr. E. B. Symonds and Dr. W. G. Benner, also of the Maryland office of tuberculosis eradication, demonstrated the intradermic tuberculin test. Drs. W. E. Langford and W. M. Stanley, of West Virginia, and Dr. L. B. Ernest, of Washington, D. C., led the discussion of the operative technique and interpretation of results of this test.

In the afternoon the association held its regular semi-annual business meeting. The minutes of the previous meeting were read and approved, following which Dr. G. A. Grapp, of the Maryland State Board of Agriculture, led the discussion regarding a more comprehensive and closely drawn act to regulate the practice of veterinary medicine in Maryland.

The meeting closed with a rising vote of thanks to Dr. G. A. Melody for his efforts to make the meeting a complete success,

and to Dr. Adams for his courtesy in extending to us the pleasure of his company.

A. H. BRYAN (*through HULBERT YOUNG, Secretary*).

ONTARIO VETERINARY ASSOCIATION

The forty-second annual meeting was held at the Ontario Veterinary College on August 11 and 12. Over one hundred veterinarians from different parts of the province were present.

The meeting convened with the president, Dr. J. A. Campbell, presiding.

Business matters, election of officers, etc., occupied the whole of the first morning, and addresses, papers and discussions were on the program for the afternoon and evening. "Standardization of Veterinary Fees," by Capt. J. Dunn of Barrie, Ont., brought forth much discussion, and a schedule of fees for members of this association has been presented to the executive committee for consideration. It is hoped that by adopting this schedule greater cooperation will exist among the practitioners in the province. Dr. A. B. Wickware of the Biological Laboratories, Ottawa, gave an illustrated address on "Diseases of Poultry." He emphasized the economic importance of poultry to Canada and urged veterinarians to pay more attention to this phase of livestock breeding. He stated that the fowls in Canada were worth \$200,000,000, and it was therefore essential to conserve this great industry by safeguarding the flocks from the ravages of disease. The diseases of chicks were dealt with, and tuberculosis, blackhead, etc., were also briefly mentioned.

At the end of the afternoon session, an excellent lunch was served in the assembly hall and great credit is due Drs. Otte-well and Gwatkin for preparing such a satisfying meal.

The first address in the evening was delivered by Dr. C. D. McGilvray, principal of the Ontario Veterinary College. He spoke on the Andrew Smith Memorial Fund and stated that during the past year the sum of \$134.55 had been realized for this fund. He appealed to the members for further subscriptions, and Dr. C. H. Higgins of the Lederle Antitoxin Laboratories, New York, also made a strong appeal, with the result that \$143.85 was collected at the meeting and \$9 more pledged.

Dr. F. Torrance, Veterinary Director General, addressed the meeting on "Tuberculosis and the Accredited Herd Plan." He

outlined the fight in progress against tuberculosis which is being made by his department, and drew attention to the number of municipalities availing themselves of government inspection of cows. The number of cows tested under this system for the first four and a quarter months of the present fiscal year greatly exceeds the number tested during the whole of the preceding year. The accredited herd plan is also making great progress. The number of accredited herds in Canada is now 22, and 541 are under process of accreditation.

Dr. Robert Barnes, Chief Inspector, Meat and Canned Foods Act, gave a very interesting paper on "The Inspection of Canned Foods." He pointed out that no profession was so well qualified to inspect the raw material (which, of course, constitutes the principal part of the inspection) as were veterinarians. The numerous difficulties that had been encountered by his department were being overcome, and the inspection was being carried on efficiently and to the entire satisfaction of the canners. This paper brought forth some interesting discussion and the questions which were asked were promptly answered by Dr. Barnes.

Dr. C. H. Higgins next gave an interesting talk on "Service." Dr. Higgins is one of the most popular members of the association, and in his address made many timely remarks that were well received.

Both Drs. McGilvray and Higgins spoke on the *Canadian Veterinary Record*, and pointed out that the united efforts of Canadian veterinarians were necessary in order that the journal might continue to be published. They remarked on the good work being done by Colonel Evans (the editor), Dr. Gwatkin, Dr. Fowler and others. At this meeting 25 more subscriptions to the journal were made.

The meeting on the second day opened with demonstrations in the application of the tuberculin tests by Dr. McGilvray. He thoroughly explained the technique of all the tests and showed reactions in cattle that had been injected previous to the meeting.

Dr. J. F. De Vine of New York next gave an instructive talk on sterility. He stated that the methods employed on this continent were far ahead of those in any other country. The corpus luteum was fully described and its significance explained. Diagnosis of pregnancy was thoroughly outlined from a few weeks after conception up to parturition. Uteri of cows, both virgin

and in various stages of pregnancy, were supplied by Drs. D. A. Irvine and C. W. McIntosh, enabling Dr. De Vine to fully illustrate his methods. Dr. De Vine also demonstrated the treatment of sterility in several cows sent in for that purpose.

Equine surgery was performed by Dr. W. J. R. Fowler of Toronto, and Dr. D. R. Caley of Bracebridge performed cryptorchidectomy and reduced a hernia in a large pig.

Drs. R. A. McIntosh of Oakville and H. E. Batt of Toronto acted as assistants during the clinics.

The officers elected for the ensuing year are: Dr. J. A. Campbell, Toronto, president; Dr. D. R. Caley, Bracebridge, first vice-president; Dr. T. B. Buckley, Toronto, second vice-president; Dr. H. E. Batt, Toronto, Dr. J. Dunn, Barrie, Dr. D. A. Irvine, Toronto, and Dr. W. A. Thompson, Washago, executive committee; Dr. J. S. Glover, Toronto, secretary-treasurer and registrar.

J. S. GLOVER, *Secretary*.

An American writer in Denmark tells of an interview with "Dr. Bang, who has led the fight against bovine tuberculosis for 30 years. Dr. Bang was intensely interested in the progress of tuberculosis control in America and said that he believed our system of accrediting herds would accomplish good results."—*Hoard's Dairyman*.

Sixty-four species of mosquitoes have been discovered so far in Costa Rica, according to a list recently presented before the French Academy of Sciences.

Deseret News says of Federal meat inspection: "This is one of the reforms that has made progress swiftly and the thoroughness with which it is carried out is at once admirable and marvelous."

Dr. W. A. Scott, of Akron, Ohio, has assumed charge of the dairy and food division of the city department of health of Canton, Ohio. Dr. Scott has been engaged in this same kind of work in the city health department at Akron. He succeeds the late Dr. Charles Ray, who died recently.

COMMUNICATION

"PROTECTING THE STOCK"

To the Editor:

We are inclosing a copy of an editorial which appeared in the *Harrisburg Telegraph* of June 27, 1921, under the title above quoted, as follows:

"The whole State will wish well to the campaign launched under the auspices of the State Bureau of Animal Industry and backed up by federal authorities and the veterinarians of the State for the reduction of tuberculosis, cholera, parasitic and other diseases which have been killing the livestock on Pennsylvania farms through lack of systematic effort. During the war people woke up, perforce, to the great importance of safeguarding the health of the horse and cow, the pigs and sheep and the chickens, too, and, thanks to the emergency, restrictions and inspections could be undertaken, which it is planned to supplement.

"The mere statement of the loss occasioned every twelve months to stock in Pennsylvania by controllable diseases should be enough to make everyone join in this movement to clean up the herds and the flocks and protect not only the investment of the farmers and many townspeople but our health as well because we all use milk and meat."

As this editorial brings out, the work to be successful must include the combined interest and cooperation of every agency that has to do with livestock. In this connection there is no more important agency than the practicing veterinarian. The practitioner becomes intimately acquainted with the livestock owners and is familiar with their problems. By continuing to do missionary work among the livestock owners of the State the Bureau of Animal Industry will be materially assisted in its work of preventing and repressing animal diseases.

By reason of the work the practitioner has done in keeping us informed of conditions in his district we have come to look upon him as a local representative of our Bureau.

In addition to the assistance rendered in preventing and repressing other wasteful diseases of animals and poultry, he has also been supporting the Accredited Herd Plan for repressing tuberculosis, and we are sure his efforts along this line are equally appreciated by the Federal authorities.

We are proud of the fact that the cordial relations, the co-operation and support that exist between the private practitioners of Pennsylvania and the Bureaus are not surpassed, if indeed equalled, by any other State in the Union. This is exactly as it should be.

We trust the practitioner will continue to keep us in touch with affairs in his locality, and we stand ready at all times to assist him as far as lies within our power.

The Bureau may formulate plans for carrying out measures pertaining to livestock problems, but without the cooperation and support of the practicing veterinarian our labor will be in vain.

We are counting on his continued support and cooperation in the drive to reduce losses from preventable animal diseases.

T. E. MUNCE, *State Veterinarian*.

One thousand buffaloes in the National Park at Wainwright (Alberta, Canada) will be slaughtered this year, according to Government plans. The park contains 5,000 at present. Those picked for slaughter will be mostly bulls. They will be sold in the markets of Canada and the United States.—*Wichita Daily Stockman*.

Dr. W. T. Spencer has resigned his position as State Veterinarian of Nebraska to become livestock commissioner in connection with the Omaha Livestock Exchange. Other important exchanges will shortly be organized with livestock commissioners, in order to assist in the tuberculosis eradication campaign in their communities.

Dr. J. T. Ellis, formerly of the hog cholera control force of the Bureau of Animal Industry in Tennessee, is now assigned to the same class of work in Iowa.

Dr. A. J. Wahn has recently disposed of his practice in Fosters, Ohio, and has again become affiliated with work of the Bureau of Animal Industry in South Carolina.

NECROLOGY

Dr. G. Frank Harker, one of the most prominent veterinarians of New Jersey, died September 3, 1921, and was buried from his late residence, 566 Perry Street, Trenton, N. J., September 6.

Dr. Harker was a graduate of the University of Pennsylvania, class of 1889, and had practiced his profession in Trenton since graduation. He was City Veterinarian and Chief Food Inspector of the Board of Health of Trenton since 1906. He was honored by the veterinary profession in his State in being elected President of the New Jersey Veterinary Medical Association. He was prominent in Masonic circles, belonging to Ashlar Lodge No. 76, F. and A. M., Trenton; Consistory S. P. R. S., 32d degree Scottish Rite; Crescent Temple, A. A. O. N. of the Mystic Shrine. He also belonged to Meni Lodge No. 217, I. O. O. F.

Dr. Harker was a victim of one of the most violent endemics of typhoid fever of which there is record. He attended a harvest home supper held at Jacobstown, N. J., on July 27. Chicken salad was served, and as a result of infection 200 cases of typhoid have developed in 116 homes in 23 municipalities, resulting in 26 deaths up to September 5.

The funeral was very largely attended. Many beautiful floral pieces attested his many friends. The following veterinarians were among those present at the funeral: J. H. McNeil, W. G. Middleton, James Mosedale, R. E. Mosedale, R. W. Carter, J. M. Herron, R. Brown, C. Beechwood, J. M. Delaney, J. H. Carter, H. H. Bair, L. P. Hurley, Henry W. Turner, New Hope, Pa., and John P. Turner, Washington, D. C.

Dr. Harker will be greatly missed by his friends and professional associates, as he was a man of the highest personal integrity and of a quiet, lovable disposition. He leaves a widow, two sons, and one daughter.

Dr. F. E. Barnes, of Waxahachie, Texas, who recently was bitten by a rabid dog which he was treating professionally, has gone to Austin for treatment in the Pasteur Institute.

MISCELLANEOUS

INTERNATIONAL CONFERENCE ON EPIZOOTIC DISEASES OF DOMESTIC ANIMALS

AT THE International Conference on Epizootic Diseases of Domestic Animals, held in Paris in May, 1921, the following conclusions and recommendations were adopted:

RINDERPEST

The Conference finds:

1. That in view of the uncertainty of our knowledge with regard to the resistance of receptive animals and of the variations due to the species, race or individual circumstances, the introduction of ruminants and hogs from regions that are not absolutely free from rinderpest constitutes a danger that justifies prohibitive measures.

2. That there is reason to continue experimental investigations with regard to mode of contagion, receptivity of the different animals, virulence of the various animal products, dangers that may result from conveyance of the virus by animals apparently cured or healthy, and, in general, everything relating to the experimental study of rinderpest.

Supplementary Recommendations

The Conference recommends that the fight against rinderpest be based on the following fundamental rules:

1. Immediate information, by telegraph to neighboring countries, of the new sources of infection that may be found in regions previously free.

2. In principle, compulsory slaughter of diseased animals and of those clinically suspected, also, as far as possible, of exposed animals, even if apparently healthy, with ample and immediate indemnity.

3. To prohibit the use of a live virus for the purpose of immunization in places that are free from the disease.

4. To prohibit the industrial or commercial manufacture of serums and vaccines against rinderpest, in districts free from the disease, with the exception of scientific institutions or those controlled by the state.

FOOT-AND-MOUTH DISEASE

The Conference finds:

1. That there is reason to continue actively the investigations relative to the study of foot-and-mouth disease, principally for the purpose of discovering scientific methods of treatment and a process for the practical immunization of the exposed animals.

2. That it is desirable that, without in any manner affecting the independence of investigators, connections be established among the several laboratories specializing in the study of foot-and-mouth disease, and that the results obtained, both in the laboratories and on the field, including negative or partial results, be immediately communicated and centralized.

DOURINE

The Conference finds:

1. That strict and continued vigilance should be organized in all countries where sources of infection of this disease should at any time be discovered.

2. That investigations relative to the treatment, practical methods of diagnosis of dourine, and persistence of the virus in animals apparently cured, should be continued, and reports immediately made of the results obtained.

Supplementary Recommendations

The Conference recommends:

1. That in districts menaced by the disease the stallions be registered and submitted to a monthly sanitary inspection.

2. That in those districts all mares already served or ready to be brought to the stallion be registered and also be subject to a monthly sanitary inspection.

SANITARY INFORMATION AND BULLETINS

The Conference finds:

1. That sanitary information should be telegraphed to all countries represented at the Conference when rinderpest appears in a region previously free from it, and also when the first cases of foot-and-mouth disease are noticed in a country previously free.

2. That printed periodical bulletins should be published following a uniform plan and furnishing information with regard

to the existence and extent of the following diseases: Rinderpest, foot-and-mouth disease, contagious pneumonia, anthrax, sheep pox, rabies, glanders, dourine, hog cholera.

3. That such information should include, for each province or State invaded:

(a) The number of counties and farms still infected at the beginning of the period reported;

(b) The number of counties and farms infected during the period reported, and, if possible, the number, classified by species, of the animals that are found sick or exposed.

4. That the bulletins should be published on the 1st and 15th of each month, and that they should be distributed, at the latest, ten days after the date of their publication, so they will reach the interested governments without delay.

EXPORT SANITARY MEASURES

The Conference believes that animals and dangerous animal products, when exported from one country to another, should be accompanied by a "certificate of origin and health" issued under the responsibility of the exporting country, by a government veterinarian or one approved by the government.

The wording of the certificate should be studied by each country, and the different texts or wordings should be examined in a future conference, with a view to arriving at the appropriate form, which should be submitted to the approval of the delegates of the countries represented.

INTERNATIONAL BUREAU

The Conference expresses the wish that an international bureau be created in Paris for the campaign against infectious animal diseases. It should have for its essential purpose:

(a) To collect and bring to the notice of the governments and their sanitary departments the facts and literature of general interest regarding the progress or condition of epizootic diseases, and the means employed to fight them.

(b) To promote and coordinate all investigations or experiments relative to the pathology or prophylaxis of all infectious animal diseases, wherever there may be occasion to resort to international cooperation.

(c) To study international plans and agreements relative to

the sanitary inspection of animals, and to place at the disposal of the governments signing these agreements the means of controlling their execution.

The office should be placed under the authority of a committee composed of the technical delegates of the several countries. This committee should meet periodically at least once a year. With the approval of the governments signatory to the Rome Convention of December 9, 1907, said bureau should be attached to the International Bureau of Public Hygiene.

The Conference desires that the French Government prepare a draft of a convention embracing the resolutions adopted by the Conference, submit it to all countries represented at the Conference, and invite the interested governments to appoint representatives to sign such convention at the earliest possible date.

The Conference appoints Messrs. Lutrario, Pottevin and Leclainche to get in touch with the proper French authorities and place themselves at their disposal for the purpose of helping them in the preparation of this draft of convention.

NOTES ON RINDERPEST

Rinderpest, which was believed relegated to the Asiatic and African continents, has reappeared in these latter times in Europe and has reached South America. In August, 1920, rinderpest was discovered in Belgium, imported through the simple passage in transit at Antwerp of Indian zebras destined to Brazil. In March, 1921, it is found in Brazil, and it is probable that it was brought there by the same animals. Russia in Europe has been infected largely during these last years by livestock from Asia. The disease was introduced in Poland following the invasion of Russian armies and the exodus of population provoked by it.

International sanitary conferences were held at Vienna in 1920 and at Kovno on February 23 and 24, 1921.

The rinderpest invasion of Russia in Europe and its spread to regions invaded by the Bolshevik armies could be foreseen as an inevitable consequence of the disorganization of administrative services and particularly of the sanitary police. On the other hand, the introduction of the contagion by the commercial route seemed unlikely. It demonstrates the necessity of a more

complete study of epizootic diseases and of possible ways for their transmission.

Notes taken during the Belgian epizootic bring very reassuring new views on the ways in which the contagion is spread. It is established that indirect transmission is very exceptional and that in a country possessing a good sanitary organization the spread of rinderpest is easily stopped by appropriate sanitary measures. On the other hand, rinderpest spreads rapidly, especially through the movement of exposed animals in countries which do not possess both an organized veterinary service and an administrative organization enabling rigorous application of prophylactic measures.

Prophylaxis of rinderpest is rendered difficult and uncertain by our lack of knowledge on a number of questions.

Studies carried on in Brussels by the French Mission have established a few points. They have brought the proof that swine may contract rinderpest under forms that render them very dangerous from the viewpoint of contagion. These animals were previously considered refractory and various regulations in force seldom take them into consideration.

It seems that contagion by animal products is little to be feared, the virus being rapidly destroyed in most mediums. However, it is indispensable that conditions of sterilization be determined exactly before giving up the very severe measures of protection heretofore applied. The realization of these researches present for commerce a considerable immediate interest.

Also, the danger resulting from the introduction of live animals will have to be established by new observations. The resistance of certain species allows the movement of exposed shipments to great distances. It is possible also for cured animals to remain dangerous for an undetermined time.

Finally, the use of various processes of immunization, serotherapy and sero-vaccination, will have to be studied anew.

It would be very desirable that missions which various governments have placed at the disposal of Poland be able to gather data and complete experiments according to a plan established by the Conference.

Rinderpest in Brazil

Rinderpest has appeared recently in Brazil, in the State of Sao Paulo.

The origin of the disease has not been clearly established;

however, the importation of Indian zebus, which infected Belgium, has been incriminated, and this hypothesis is by far the most likely among those that have been presented.

It appears from information dated April 13, 1921, that rinderpest has caused the greatest ravages in the State of Sao Paulo and that it has reached the neighboring States of Minas and Rio.

"The epidemic is developing with a fearful rapidity," says a report. "The spreading agents would seem to be other animals and more especially stray dogs and above all 'urubus.' Urubus are birds of prey of the vulture species. In cities they are found in proximity to abattoirs and feed on trimmings from carcasses. In stock-raising regions they are always found around herds. They alight on the animals and tear the skin to eat certain parasites. Covering rapidly great distances, these birds are terrible spreading agents of epizootics. Up to this time urubus have owed their survival to the belief held in the country in their role of scavengers. But rinderpest is about to give them a fatal stroke, for now everywhere the necessity of their destruction is proclaimed to prevent the spread of epizootics.

"The Government of the State of Sao Paulo has taken, from the beginning, energetic measures to limit the epizootic. The neighboring States and the Federal Government also adopt strict measures to prevent rinderpest from attacking herds previously free."

Instructions have been prepared by the Direction of Stock-Raising Service at Sao Paulo and sent to all proprietors.

It seems that Brazil unfortunately lacks veterinarians to assure the execution of prescribed measures.

Rinderpest in Poland

Rinderpest was introduced into Poland in July and August, 1920, by Bolshevik troops followed by infected herds. It spread during the occupation of eastern territories and during the weeks that followed between the retreat of the invaders and the installation of Polish authority. The palatinates of Bialystok, Lublin, Warsaw, and two districts of eastern Galicia were reached.

In September partial demobilization of veterinarians permitted the beginning of sanitary action, and a credit of one billion marks was granted. A commissioner-in-chief was appointed with

wide powers, and three sanitary zones were instituted. A first mobile zone called "military zone" is situated at the limit of the invaded territories; a second zone called "of high command" is established on the actual political frontier; a third zone called "Ministry of Foreign Affairs Zone" isolates the eastern provinces, in which intervention must be abandoned temporarily to military authority because of lack of personnel.

A laboratory has been established at Pulawy for the preparation of anti-rinderpest serum, with 300 cattle, and a second laboratory has been established at Brest-Litovsk with 100 cattle.

In November the personnel was reinforced by the students of the veterinary colleges and of the superior schools of agriculture. Numbers of new centers of infection were discovered.

Rinderpest was introduced as far as Pomerania, in the district of Blonsk, by military formations, which, despite prohibition, have brought exposed livestock back from the front. This center of infection was rapidly cleaned up.

The following figures give a résumé of the progress of the disease:

RINDERPEST IN POLAND

Period	Infected Localities	Infected Premises	Affected Cattle	Died	Slaughtered	Recovered
November 1, 1920	135	1,572	3,815	1,831	1,549	419
November 1 to 30	146	2,091	2,141	958	1,286	163
January 1 to 31, 1921	107	886	212	35	171	50
February 1 to 28	74	1,123	287	231	43	10
March 1 to 22	30	68	90	7	78	5

Information concerning Galicia is lacking.

The presence of rinderpest in Poland has alarmed all the countries of Central Europe, and two sanitary conferences have been held: one in Vienna in November, 1920, and the other at Brest-Litovsk in February, 1921.

On the other hand, great assistance has been extended to Poland to aid her in fighting the plague. Denmark sent Professor Jensen with fifteen Danish or Norwegian veterinarians and a subsidy of 50,000 crowns for the purchase of material. France sent two veterinarians with material and a supply of anti-rinderpest serum. Czecho-Slovakia and Hungary were represented also, and Germany, Austria and Norway offered their aid.

The Conference can not do otherwise than note with satis-

faction this spontaneous manifestation of solidarity which presents a timely demonstration of interest of a joint action of the civilized nations against the dangers that threaten the animal populations.

NOTES ON FOOT-AND-MOUTH DISEASE

Foot-and-mouth disease has existed permanently in Europe for nearly half a century, with periods of calm interrupted by epizootic outbreaks. The most varied sanitary systems have been utilized without success. The closing of frontiers is not sufficient in the absence of insurmountable natural obstacles, and even the presence of these is not an absolute guaranty. The example of Great Britain is striking in this respect.

In the interior of an infected country it is possible to achieve the eradication of the first centers of infection by the slaughter of all sick and exposed animals conditionally on the discovery of centers of infection on their appearance and the availability of a police and technical organization equally active.

The experiment that Switzerland has carried on in these latter times presents considerable interest. "Stamping out" has been applied under the most favorable conditions—a small country possessing a good administrative organization and an excellent veterinary service; general acceptance of the population of protective measures rigorously applied; very judicious use of the method. In spite of these exceptional conditions the experiment has failed. The system appears as practically useless in most circumstances, especially if succeeding reinfections are feared (presence of the disease in a neighboring country; numerous centers of infection already established, etc.).

The lack of sanitary police measures can be replaced only by the immunization of exposed animals.

To be practicable a method of immunization must be simple, cheap, and of general application. In the present state of our knowledge the processes of sero-therapy, sero-vaccination and vaccination seem alone susceptible of utilization.

The laborious researches carried on during the last twenty years in Germany, France and Italy have brought, in place of the foreseen practical solution, a number of useful indications. Perseverance in this path should be continued in spite of the difficulties encountered. The governments have understood all the interest of these studies. At this time experi-

mental study of the prophylaxis of foot-and-mouth disease is carried on officially in Great Britain, France and Italy.

The Conference will probably consider it desirable that, without interfering with the independence of investigators, relations be established between the various laboratories specializing this study, and that results already obtained be communicated as soon as possible, to be checked or to serve as the basis for further experiments.

NOTES ON DOURINE

Recent war happenings have resulted in numerous centers of infection of dourine.

In 1914 the disease was practically unknown in Central and Western Europe. In 1921 dourine is found in Poland, Germany, Czecho-Slovakia, Rumania, Belgium, France, Italy and Spain, as follows:

Poland (January), two centers of infection in the Governments of Lodz and Warsaw.

Germany (February 28), 12 cantons, 89 communes and 144 stables in Prussia (Konigsberg, Mersebourg, Erfurt, Minden) and in Thuringia.

Czecho-Slovakia (March 17), Departments of Varasz, Pozeska, Zagreb.

Rumania (January 28), 8 departments, 157 stables with 286 affected animals.

Belgium (April), 18 stables in 12 communes, with 1 stallion and 16 mares affected.

France: Dourine is found only in Alsace, where it was imported during the German occupation. In April there were 152 stables having infected animals in 33 communes.

Italy (March 27), 6 provinces (Bergame, Farrare, Mantua, Pisa, Reggio of Emily, Syracuse), 11 communes and 14 stables infected.

Spain (February), 9 provinces (Avila, Burgos, Huesca, Logrona, Navarre, Santander, Teruel, Biscay, Saragossa), 43 infected stables with 27 solipeds dead or slaughtered.

It is certain that dourine has been spread throughout Europe by infected mares brought back from Russia by the movements of armies.

In Alsace dourine was recognized in July, 1919, in the ar-

rondissement of Selestat. A first investigation disclosed that ten stallions of the Strassburg stud and three stallions owned by a private party of Marekolsheim and 775 mares were infected in 64 communes of the cantons of Beufeld, Selestat, Marekolsheim, Ribeauville and Andolsheim.

In Belgium dourine was recognized in Flanders in March, 1920. Its origin was not determined.

It is to be considered that dourine may remain unrecognized for a long time; either that forms of atypical evolution are alone noted, or that affected mares are scattered in small numbers in the country.

The attention of veterinary forces must be drawn to the possibility of the appearance of dourine even in the absence of all reason for suspicion. The late discovery of known centers of infection leads to the fear that infected mares have been shipped out of these to other destinations.

It would be desirable that methods of prophylaxis and means of diagnosis be studied together by the various countries concerned. The remarkable results obtained recently by Canada furnish important indications in this regard.

EXCHANGE OF INFORMATION CONCERNING CONTAGIOUS DISEASES

Issuance of Sanitary Bulletins

The uncertainty of the real sanitary condition of the countries of origin constitutes the principal obstacle to the traffic in animals and animal products.

To protect themselves against an eventual danger all nations strike all doubtful importations with systematic prohibition. With reason we dread what we know not, and shipments from countries which do not supply precise information as to their sanitary condition are refused on a par with those from infected regions.

An exporting country therefore has every reason for giving information on the health of its livestock that guarantees the harmlessness of its shipments. This obligation is more imperative in regard to adjoining countries exposed in the absence of unsurmountable natural frontiers to neighboring contagion by the extension of infected zones.

The value and the import of information thus transmitted

are subordinated to two essential conditions. They must (1) be rigorously exact, and (2) be transmitted promptly.

(a) The exactness of sanitary information implies a permanent efficacious surveillance over all exposed animals. It presumes a complete sanitary organization; in other words, a veterinary police service giving all desirable guaranties, from the double viewpoint of the control exercised and of the competency of the personnel employed.

The all-embracing and permanent character of sanitary surveillance is evidently indispensable. These conditions are realized at this time in almost all the countries of Europe and in a few others. They are lacking more or less completely in others, especially in the colonies.

A graver circumstance is that the nosology of certain regions is not known exactly. Tropical diseases, for example, are badly defined and their etiology is insufficiently known. In the legitimate dread of a possible danger a number of prohibitions are promulgated which it will doubtless be found practicable to abandon in the light of further research.

Permanent control over all animals must be exercised by a learned and disciplined personnel. A contagious disease should be quickly diagnosed and its existence brought at once to the attention of the authorities. A veterinary sanitary organization can not be considered adequate unless it comprises a competent staff of scientists utilizing all scientific means of research.

To sum up: Sanitary reports must not only give more or less complete information; they must show the real sanitary state of the country for the period covered. It is by this essential condition that they will be of value from an international standpoint. Any incomplete report should expressly mention the fact that it is incomplete.

(b) Sanitary information must be exchanged promptly.

Indications in this regard vary according to the diseases considered. For certain diseases like rinderpest and foot-and-mouth disease, the notice of appearance should be immediate; all governments should be notified by telegraph. In the case of rinderpest this obligation must be extended to simple suspicion in all cases where an experimental diagnosis can not be made immediately. It must be agreed that this state of suspicion exists

for any affection resembling rinderpest that has not been identified with absolute certainty.

Afterwards it will be sufficient, for both rinderpest and foot-and-mouth disease, to publish information on the progress of the disease under the conditions hereinafter mentioned.

In a general way, and save in cases indicated above, information of a sanitary nature has not a character of absolute urgency and it may be usefully inserted in periodical sanitary bulletins. These should contain information related, on the one hand, to contagious diseases generally classified, such as contagious pleuropneumonia, sheep pox, rabies, glanders, dourine, anthrax, swine erysipelas, swine plague, hog cholera and avian pest, and on the other hand to all the special affections susceptible of transmission through an epizootic or enzootic type (piroplasmosis and anaplasmosis, contagious mammitis, Malta fever, swine pox, malignant strangles of the horse, influenza of the horse, etc.). The bulletins should give as much statistical information as possible concerning bovine tuberculosis, blackleg, and scabies of horses, sheep and goats.

The geographical division of the reported diseases will be sufficiently indicated by the mention of cases in provinces, departments or corresponding territorial divisions.

Statistical information, varying according to the diseases considered, should give in all cases the number, for each animal species, of the affected and exposed animals. In a general way figures given should comprise (a) the number of communes and premises still infected at the beginning of the period considered, and (b) the number of new centers of infection observed during this same period (communes, premises, and, if possible, the number, by species, of affected and exposed animals).

It would be very desirable that the sanitary bulletins of various countries follow a uniform or comparable style which would facilitate their perusal and the use of the statistical material. The adoption of a standard form by all the nations participating in the present Conference would be ideal. The periodicity of bulletins now published is very variable; they are published monthly, semi-monthly, every 10 days, or weekly. These variations render statistical comparison very difficult. It is to be hoped that the same periodicity be adopted everywhere.

In France for a long time the bulletins were published monthly. This method presented the grave inconvenience of not bringing to the knowledge of those concerned the changes occurring in the sanitary state with sufficient promptness. The weekly publication, afterwards adopted, had the other inconvenience of not permitting the preparation of exact monthly or even yearly statistics. For these reasons a bulletin appearing every 10 days has been chosen, or, more exactly, a tri-monthly bulletin, for periods terminating the 1st, 10th and 20th of each month.

Whatever method of publication is adopted, it is essential that bulletins be issued very promptly, six to eight days seeming sufficient for their preparation, printing and forwarding.

SANITARY MEASURES FOR EXPORTATION

Quarantine Station for Exportation

So far, countries importing animals or animal products have had to protect themselves against the dangers of contagion by appropriate sanitary measures applied on landing or on entry at the frontier.

In the case of animals, these measures comprise the "sanitary visit," consisting either of a simple clinical examination or in the use of certain rapid diagnostic processes (use of tuberculin or mallein). In addition "certificates of origin and health" are required, the value of which varies according to the conditions of their issuance. In fact, the "sanitary visit" of animals furnishes only very incomplete information. In all cases it permits only the discovery of affected animals, and the importers often have all facilities for eliminating those at the time of entry at the frontier and entering the exposed animals.

The requirement of quarantine for observation constitutes a heavy charge on commerce. It necessitates the construction of special buildings, well equipped, if we would avoid both accidents and contagion. Practicable for a few great ports, these installations can not be multiplied on the land frontiers, especially as the variability of commercial currents tends to make them useless in a short time.

In a number of cases the "sanitary visit" is not reliable even for detecting affected animals. The necessity of inspecting in

a very limited time a great number of animals (herds, train loads of important shipments) renders greater the uncertainty of the inspections.

Special methods of control are utilizable only in a few cases and then give only very insufficient guaranties. The case with which the results of the tuberculin test are falsified by frauds is well known.

The necessity for numerous countries to multiply the ports of entry for livestock, with the aim of facilitating commercial transactions, tends to enfeeble the efficacy of a control that can not be usefully exercised at ports of small importance having a personnel insufficient in number if not in quality.

Again, considerations of another character intervene. Animals recovered from certain affections may remain dangerous for a long time. Others carry indefinitely virulent agents difficult or impossible to discover. For all these reasons control at the time of importation can give only relative guaranties and explains the fact that sanitary regulations of most countries provide that imported animals must submit to a more or less prolonged sanitary surveillance at destination.

It is also understood that importing countries hesitate to permit the introduction of animals of which the state of health can not be guaranteed with certainty, regardless of required inspections. In fact, the exporting country alone can gather all the elements necessary to the affirmation of the state of health of an animal. The "certificate of origin and health" can give all guaranties provided it is issued in good faith. In the first place, this certificate must be delivered under the responsibility of the Government, by duly qualified agents, themselves effectively responsible to their government. In the second place, the text of this certificate must indicate explicitly the character of the guaranties offered: it will attest, for example, that the animal or animals designated are free from such or such affection, and that they have not been exposed to the contagion of this or that other disease.

The fact that the issuance of such certificates will be practically very difficult in most countries can not be overlooked. It supposes, in fact, that the delivering agent knows the origin of the animals and the sanitary condition of the premises where they have been kept, and that he has also controlled the condi-

tions of shipment from the premises to the embarkment or at the crossing of the frontier.¹

These difficulties have suggested the creation of "quarantine stations for exportation," in which animals would be subjected to a prolonged inspection and to a series of controls permitting the certification that they are free from certain diseases. Great Britain at Pirbright has installed a station of this character. Exported bovines may be placed under surveillance, tested with tuberculin, and even immunized against epizootic abortion, hemoglobinuria, and, eventually, against other diseases.

It seems that this control can be exercised currently only for certain kinds of animals, breeders for example. It may still function while a general prohibition is promulgated by importing countries, exception being made in favor of animals having passed through the quarantine stations and thus offering exceptional guaranties. The surveillance exercised must include the embarkation, measures being taken to avoid all risk of contagion during the necessary operations and during the voyage.

This question seems to be withheld by the Conference in the common interest of exporting and importing countries, the conditions of control to be exactly determined. If it is admitted that quarantines of exportation are practicable only under exceptional conditions, there is need of consideration of guaranties that may be normally required.

The old formula of the "certificate of origin and health" is practicable and can have a real value only if it is correctly applied. The certificate will vary in its import according to the requirements of the importing country and the sanitary condition of the country of origin. It may mention that the animals are free from determined contagious diseases and, if need be, that they originate in regions likewise free. It should be issued by a veterinarian designated or approved by his government, having received precise instructions and being responsible for their execution.

¹In France a decree of the Minister of Agriculture dated December 31, 1920, prescribes that bovines originating in the Netherlands must be accompanied by a sanitary certificate attesting that the animals were free of tuberculosis, epizootic abortion, hemoglobinuria or hematuria, and contagious vaginitis, and that they came from premises free from such diseases. The Government veterinarians of the Netherlands have refused with reason to deliver these attestations, declaring that it was impossible for them to control the origin of the animals and for this reason to certify to the sanitary condition of the premises from which they came.

JOURNAL

OF THE

American Veterinary Medical Association

FORMERLY AMERICAN VETERINARY REVIEW

(Original Official Organ U. S. Vet. Med. Ass'n.)

J. R. MOHLER, Editor, Washington, D. C.

A. T. KINSLEY, President, Kansas City, Mo. N. S. MAYO, Secretary, Chicago, Ill.
M. JACOB, Treasurer, Knoxville, Tenn.

Executive Board

GEO. HILTON, 1st District; T. E. MUNCE, 2nd District; S. E. BENNETT, 3rd District;
J. A. KIERNAN, 4th District; C. E. COTTON, 5th District; R. A.
ARCHIBALD, 6th District; CASSIUS WAY, Member at Large

Sub-Committee on Journal

S. E. BENNETT

J. A. KIERNAN

The American Veterinary Medical Association is not responsible for views or statements published in the JOURNAL, outside of its own authorized actions.

Reprints should be ordered in advance. Prices will be sent upon application.

VOL. LX, N. S. VOL. 13

NOVEMBER, 1921

No. 2

IMMUNIZATION AGAINST FOOT-AND-MOUTH DISEASE

RECENTLY there have appeared in the agricultural press articles announcing the discovery in France of a serum for the immunization of cattle against foot-and-mouth disease. These articles create the impression that a new discovery has been made and that in the future foot-and-mouth disease can be prevented as successfully and economically as hog cholera, rabies, diphtheria and typhoid fever, which is not true.

To Prof. Loeffler we owe most of our present knowledge relative to the effects of serum immunization for foot-and-mouth disease. When he was in charge of the laboratories of the German Government he developed a serum that was in a measure successful. The work in France by Vallée, Nocard, Leclainche and Carré is based on the previous investigations of Loeffler. In a recent communication Prof. Vallée says: "At present we are studying the immunizing value of the blood of recovered animals; but material difficulties are always encountered in the application on a large scale."

The experiments of Prof. Loeffler proved that the serum does not protect animals in small doses (20 to 30 cubic centimeters), but large repeated doses afforded a protection to the animals for a short time and might be employed to advantage in eradication

work when control of the disease is attempted by quarantine measures and also to immunize cattle for transportation and exhibition purposes.

In the partly successful German experiments, animals over 3 months old received four injections of serum at intervals of 10 to 14 days. The first injection consisted of 200 c.c. and the subsequent injections of 60, 30 and 30 c.c., respectively. Considering that the preparation of a liter (about a quart) of serum cost \$25.00 in Germany before the war when the experiments were made, it cost over \$8.00 to protect every animal over 3 months old even when the hogs used for the preparation of the virus were passed for food. If the hogs were not passed for food the cost of the serum would be at least doubled. It should also be considered that in these experiments 6 to 8 per cent of failures occurred. A single failure in the United States to protect might prove to be the source of a new outbreak.

The impracticability of the serum immunization is further augmented by the difficulty of preparing the serum; and particularly on account of this disadvantage the method could not be utilized satisfactorily in countries where the disease is not generally prevalent or where it occurs only as a result of its periodical introduction.

The preparation of the serum requires propagation of the foot-and-mouth disease virus, and such a procedure in this country would be a constant menace to the livestock industry, even with the exercise of the greatest precaution and care. This was demonstrated in Germany when the Government was called upon to pay damages for losses from outbreaks resulting from the escape of the virus from Prof. Loeffler's laboratories.

Protective serum can not be kept for a period of years, as it deteriorates; therefore the preparation of such serum could only be considered at the time of the appearance of an outbreak. In view of the great quantity required for immunization of a single animal, it is almost incomprehensible how a sufficient amount could be produced to protect the susceptible animals in one of our large livestock counties. It should be borne in mind that the fluid from vesicles of hogs affected with the disease is used for the hyperimmunization of cattle.

One or more injections of 100 c.c. of such vesicular fluid are made into each of the cattle which produce the protective serum. The average quantity of vesicular fluid obtained from a sick hog is about 5 c.c.; thus for each injection of 100 c.c. in hyperimmunizing cattle 20 hogs affected with foot-and-mouth disease would be required and many of the hogs inoculated do not develop sufficiently large vesicles to be of practical use. The difficulties involved at present in producing serum in large quantities suggests the impracticability of serum immunization in the United States against this disease should another outbreak occur. Furthermore the immunity conferred by the serum usually lasts only from 2 to 6 weeks.

It is hoped that Prof. Vallée will be successful in developing an immunizing treatment that will prove effective and at the same time practical from the standpoint of economy, but to date no such cheering official report has reached this country.

In view of our present knowledge of the disease and the past results of immunization we agree with the editor of the *National Stockman and Farmer* who states in a recent issue that "Such a discovery is of the greatest importance to Continental Europe, where foot-and-mouth disease causes untold loss every year. Our policy of keeping out the disease, and eradicating it if it accidentally gets in, is correct. Millions spent occasionally for eradication will be cheaper than millions spent every year for treatment."

THE EFFICACY OF VACCINE THERAPY

THE value of vaccine therapy was demonstrated in a striking way during the recent war. Antityphoid vaccination was employed with wonderful effectiveness in the Allied armies. The *Journal of the American Medical Association* (vol. 76, p. 1576), summing up a large series of statistics from numerous armies, finds that the frequency of typhoid fever in vaccinated and unvaccinated troops is generally in about the ratio of 1 to 10. The specificity of the vaccination was also established, as paratyphoid was relatively high until triple vaccines were employed.

In previous wars of the last half century the typhoid mortality had varied from 11.2 to 21 per thousand troops. In the

World War the rate in the French Army in 1917 was only 0.4 per *hundred thousand*. Among 211,000 French troops in Algeria only 154 cases of typhoid occurred, and 108 of these were in men who had escaped vaccination through fraud. In the Japanese Army the morbidity of the vaccinated soldiers was but one-seventh that of the unvaccinated, and the mortality but one-eighth. In the American Army, which was practically 100 per cent vaccinated, there were but 1,056 cases of typhoid with 156 deaths among 4,000,000 troops from April, 1917, to November, 1919. This was 1 death for each 25,641 soldiers, while the death rate among the civilian population was 1 in 7,143. The British experience was also highly favorable.

"It is strange," says the *Journal*, "that of all nations engaged in the World War, only Germany expresses doubt as to the efficiency of antityphoid vaccination." The German skepticism is attributed to the inefficiency of the vaccine used and faulty methods.

VETERINARY CHIROPRACTIC

And now the lower animals are to be "adjusted"! The house organ of a brand of chiropractic dispensed from Davenport, Iowa, prints letters from some of its "graduates" describing wonderful results attained in the "chiropractic treatment" of sick animals. One enthusiastic Georgia chiropractor relates that when he "was adjusting Henry Vinson's son for an incoordination causing pneumonia" that "Mr. Vinson says, 'Doc, I have a mule that is down in the back and can't get up and wish you would come out and see if you can do something for him.'"

The versatile chiropractor looked over his new patient and "adjusted the mule between the hip bones." The mule recovered—presumably slowly enough to allow the adjuster to escape. The same practitioner also reports that he "was called to attend Mr. Ben Vandalsem's Scotch Collie who was dragging his hind legs, and after adjusting the dog he improved and got quite normal." A Texas chiropractor records the interesting case of a "cow down, all swelled up, as if she would burst." Diagnosis: "A poisoned condition." Treatment: "I adjust sixth and eighth dorsals and K. P. In

two minutes cow was up vomiting. I came back by in one hour, cow seemingly in normal condition." Now, putting the "dorsals and K. P." of a cow in position and adjusting a mule "between the hip bones" may get chiropractors into serious trouble. It is one thing to fool with the health of human beings and an entirely different thing to trifle with the health of livestock. The "patent medicine" interests of the country have been powerful enough to keep off the statute books any law that would protect the public by giving it information regarding the composition of nostrums sold as home remedies. But there are some States which forbid the sale of any livestock remedy that does not bear on the label the names of its active ingredients. Hence it may easily come to pass that if the chiropractors attempt to treat cows and pigs they may find themselves in hot water. That men, ignorant of the body and its processes, should treat the ailments of men, women and children is apparently a small thing; human life is the only thing involved. But that ignoramuses should trifle with the health of a horse or a hog is an outrage; that is property. If chiropractors are wise they will confine their malpractice to humans; it is safer.—*From Jour. Amer. Med. Assn., Sept. 17, 1921, p. 944.*

SHORTAGE OF VETERINARY STUDENTS

The *National Stockman and Farmer* for September 17 says, in an editorial: "The College of Agriculture of the Ohio State University reports a decrease in the number of new students taking agricultural courses. Ohio is not alone in this respect this year. Though we have not observed other States saying much about it probably a majority of them could report the same thing. * * * There is one profession, allied to agriculture, which should be considered by the right kind of young men because of a prospective shortage in its ranks in the future—veterinary medicine. This year only 923 students of veterinary medicine appeared in all the colleges, and only 277 graduated. In 1916 there were 2,992 students, and in 1918 there were 867 graduates. These figures * * * foreshadow a shortage of competent veterinarians and we have none too many of that kind now."

THE SURGICAL TREATMENT OF LARYNGOPLEGIA OF THE HORSE¹

By JOHN W. ADAMS

Professor of Surgery, Veterinary Department, University of Pennsylvania, Philadelphia, Pa.

LARYNGEAL STRIDOR, "whistling," "high breathing," "roaring," etc., in the horse is in from 96 to 99 per cent of all cases due to a partial or complete paralysis of the left recurrent nerve. This is the motor nerve of the dilator muscles of the larynx. These dilator muscles which abduct the arytenoid cartilage and open the glottis to its full extent at the beginning of an inspiration are two in number for each side of the larynx. The posterior cricoarytenoideus abducts the arytenoid and elevates its anterior end. The lateral cricoarytenoideus abducts the anterior end of the arytenoid cartilage and tilts the upper border of the arytenoid strongly outward. As a rule, it is these two muscles of the left side that are parietic or paralyzed, and finally become atrophic, pale in color, and undergo fatty metamorphosis. As a result of the paralysis the left side of the larynx does not dilate during inspiration. The column of inspired air forces the passive arytenoid and the relaxed vocal cord downward and inward toward the middle of the glottis, where they obstruct inspiration, cause dyspnea of varying degree, and produce a sound whose pitch depends upon the tension and rate of vibration of the vocal cord and arytenoid cartilage.

Paralysis of the recurrent laryngeal nerve occurs in all breeds of the horse and in the ass, mule, ox and dog. It appears most frequently in the English Thoroughbred and halfbred, but is by no means infrequent in the draft breeds and in the grades.

The etiology of recurrent paralysis is not fully known, but two rather distinct etiologic groups are recognized: Primary laryngoplegia, and secondary or consecutive laryngoplegia.

Primary laryngoplegia arises usually without previous infectious disease or other attributable cause, and most frequently between the ages of three and six. Hereditary predisposition

¹ Presented at the fifty-eighth annual meeting of the American Veterinary Medical Association, Denver, Colo., September 5-9, 1921.

may be strong in certain horses. Some families of Thoroughbreds show numerous roarers; other families few or none. It is possible that the early and severe training of the horse used for speed and the high development of his blood vascular system are causative factors. The recurrent nerve may be damaged by the stronger pulse wave of the common aorta or of the carotid at points where the nerve is in contact with these arteries. This, however, is a pure assumption, because the most careful histologic examination of the nerve in primary laryngoplegia has not shown the least pathologic alteration either at points of contact of nerve and artery or distal to these points. The only nerve lesion noted has been fatty degeneration of the nerve fibers of the terminal two or three inches, at the stage when extreme atrophy and degeneration of the laryngeal muscles were in evidence. In rare instances pathologic changes have been demonstrated in the "nucleus ambiguus" or origin of the recurrent nerve in the medulla oblongata.

Secondary laryngoplegia may follow such an infectious disease as influenza or such a contagion as dourine. Acute lead poisoning and the ingestion of a few plants occasionally give rise to roaring. In the pectoral form of influenza it seems probable that there may be a toxic neuritis of the nerve elements of the left recurrent laryngeal nerve, dependent in some way upon the close association of the left recurrent in its mediastinal course with a chain of lymph glands. In dourine roaring has followed peripheral neuritis of the recurrent nerve, with small round-cell infiltration. Colt distemper (suppurative lymphadenitis) and angina (acute laryngopharyngitis) have infrequently been followed by laryngoplegia. In acute plumbism there may be primary degeneration of peripheral motor nerve fibers and secondary atrophy of muscles animated by these nerves. Among plants whose ingestion may be followed by roaring are chick pea, monkshood and lucerne or alfalfa (*Medicago sativa*).

Vermeulen in an article entitled "Das Kehlkopfphleifen beim Pferde," Utrecht, 1914, advanced the opinion that roaring is not a symptom of an isolated and localized paralysis of the recurrent laryngeal nerve, but is rather to be regarded as evidence of a systemic disease involving several motor nerve centers, as the recurrent, oculomotor, trigeminal, abducens, facial. Vermeulen has repeatedly observed in roarers facial paralysis,

ptosis, strabismus, nystagmus, etc. He has also found in two roarers degeneration of the nucleus ambiguus of the medulla oblongata.

The firm, permanent adhesion of the lateral face of the arytenoid cartilage and vocal cord to the inner face of the thyroid in the position of forced inspiration may follow the removal of the mucosa of the lateral ventricle, provided there be paresis or paralysis of the dilator muscles of the arytenoid. This was first announced in 1845 by Karl Guenther, professor in the Hanover Veterinary School. He performed the operation, but did not learn its full value and did not recommend it to his students.

In 1906 Prof. W. L. Williams resuscitated the operation and abundantly demonstrated that stripping the laryngeal ventricle is the most efficient means of dealing with roaring of nerve origin. In 1910 Frederic Hobday gave the operation wide publicity throughout England and Continental Europe. Since then no more efficient operation has appeared, but numerous modifications of the original technic have been introduced by various operators.

I have presumed to present briefly the surgical procedure that I am at present following, in the hope that a general discussion may settle mooted questions.

About three-fourths of my cases have been hunters from purebred to halfbred, with Thoroughbred runners, trotters and pacers, saddlers, ponies and work horses in diminishing numbers.

EXAMINATION

The patient should be winded. Be satisfied that the objectionable sound, whether whistle, hiss or low-pitched snore, occurs during inspiration and does not originate in a nasal passage. The expired air from the two nostrils should strike the hand or cheek with equal force. Ascertain the width and rigidity of the larynx by compressing it laterally between the fingers of the two hands. In young animals it is elastic and easily compressed; in older animals somewhat stiffer. An enlarged, hard, unyielding larynx indicates chondritis and contraindicates the laryngeal operation. I have operated upon twenty-odd windy horses showing such laryngeal chondritis, without noticeable improvement in a single case.

PREPARATION OF THE PATIENT

A warm mash twelve to eighteen hours before the operation, with no food or water intervening, is sufficient preparation. I cast and induce general anesthesia in all cases. I cast because it enables me to restrain the patient safely and completely and to carry out placidly the technic I undertake. I know before I begin just how I am going to finish. A small proportion of all horses, but a large proportion of the hot-blooded, will not stand sufficiently quiet even when fastened in the stocks for a surgeon to exercise proper care in an intra-laryngeal operation. Aerobic surgery upon a valuable horse, in the presence of the owner and his friends, or his employees, makes a bad impression, does not increase your clientele, nor redound to the welfare of the patient. The first principle of surgery is to have your patient under complete control, and no horse on his feet and conscious is under control.

The horse is led out into the open where there is good, smooth sod, free of stones, and the twitch is adjusted. The English hobbles are adjusted, the unbalancing rope attached, the feet assembled, and at the command the animal is thrown on the flat of the shoulder, the attendant holding the tail, delaying the descent of the hind quarters. A grain sack tightly stuffed with straw and flattened in its middle is placed crossways under the neck to elevate the poll and protect the under eye. Chloroform is given to produce unconsciousness and insure absence of head movements, rather than for its anesthetic effect.

When the stage of surgical anesthesia appears, turn the patient into the dorsal position, which is maintained by two men on either side, while a fifth at the muzzle keeps the head extended. From the time the horse is rolled upon his back till the operation has been completed no further chloroform is needed.

INSTRUMENTS

Razor, convex scalpel, spring retractor, two or three hemostatic forceps, curved scissors, sharp-pointed concave bistoury, dressing forceps, tracheal tube, tape, cotton or gauze, tape suture needle.

THE OPERATION

The operation consists of an invading incision from the median prominence of the thyroid to the first tracheal ring, as near as

may be on the median line; the dilation of the wound, circumcision of the left ventricular sac, teasing out of its mucosa, and the introduction and securing of a tracheal tube between the cricoid and the first tracheal ring.

When the laryngeal incision has been made, compress the spring retractor and adjust the terminal hooks just anterior to the cut ends of the cricoid with its angle directed backward and resting on the skin over the middle line of the neck. Pull the skin up through the ring at the angle of the retractor and transfix it with the attached pin. The retractor will now maintain its position automatically. No artificial illumination is required when operating out of doors, even on cloudy days, but under cover or at dusk an ordinary spot light is sufficient.

The operator kneels on the left side of the neck and opposite him is an attendant holding the tray of instruments. Inspection reveals the left arytenoid motionless or moving slightly. I have never seen a right-sided paresis or paralysis with a sound left side. Under deep chloroform anesthesia neither arytenoid may move, but the left if paretic is usually slightly displaced downward and toward the lumen of the glottis. Its angle at the point of attachment of the vocal cord projects decidedly beyond the general surface of the laryngeal wall.

The first step is to incise the mucosa entirely around the top of the ventricle. This is easy by the following method:

Introduce to the bottom of the ventricle the end of a round stick about 10 inches long and of the diameter of a fountain pen, which is bent at its middle at an angle of about 45 degrees, and, grasping the outer end of this bent stick or curved instrument, pry the arytenoid cartilage and attached vocal cord toward the center of the lumen of the larynx. The bend in the lever places the hand holding it to one side of the opening and permits an unobstructed view of the vocal cord and ventricle, which are now tense and in a position to be incised. Introduce the point of the concave bistoury through the mucosa of the vocal cord at a point about one inch from the thyroid angle and upon the exact edge between the medial and lateral sides of the vocal cord, and make a superficial slit down to but not into the arytenoid cartilage. Next introduce the point of the bistoury through the middle of the lateral border of the ventricle and make a curving incision which will join the first at the arytenoid cartilage. Finally, introduce the bistoury at the beginning of the

first incision and pass it just beneath the mucosa to the beginning of the second incision, where the point should emerge. The mucosa covering the blade is then cut through by a careful drawing stroke and the circumcission has been completed.

Stripping the ventricle.—Withdraw the pry. Grasp the mucosa of the circumscribed ventricle at the middle of the vocal cord, using the side of the jaws of an ordinary pair of hemostatic forceps. Lift this edge slightly and gently, for it is often quite thin and is easily torn, and tease it away from its attachment to the muscle of the vocal cord. As soon as a quarter of an inch of this edge has been freed, grasp it with a second pair of forceps snug against the muscle. This procedure is repeated till the mucosa below the muscle has been brought to the surface, when the grasping hemostat may be rotated on its long axis and the mucous membrane rolled about its end. The loosening of the remainder of the sac is best accomplished by introducing the index finger of the left hand into the space between the vocal cord and forceps and gently teasing away the loose submucosa and lifting the sac. Use care not to scratch the perichondrium of the arytenoid, not to cut through or weaken the vocal cord, and not to wound the arytenoid cartilage.

Ablation by Eberlein's method.—Introduce the index finger of the left hand into the left ventricle and by straightening this finger press the arytenoid and vocal cord toward the midline of the larynx. In the latter position the vocal cord will be in full view and will be tense. From a point one-half inch from the arytenoid and exactly on the upper edge of the vocal cord make an incision through the mucous membrane to the arytenoid, thence for one-half an inch upward along the anterior border of the arytenoid parallel with this border and quite close to it. The length of this angular incision should not exceed an inch. Introduce the point of the index finger into this incision and carefully bore down between the sac and the outer face of the arytenoid and gradually loosen the sac from its surroundings and push its base upward through its mouth. With a pair of forceps seize the bottom of the sac, which now covers the end of the finger like a thimble, and, holding it tense, cut it away with scissors or probe-pointed bistoury.

The left sac has now been removed, and attention is turned to the right side. By this time the patient has so far recovered from the effects of the anesthetic that the right arytenoid is in mo-

tion. If on inspiration this right arytenoid does not bury itself in the wall of the larynx till its medial face is approximately on a level with the surface of the cricoid below it, I regard its abductive power as suspicious, and am inclined to remove the right ventricle. I confess, however, that for several years I have been removing the right ventricle in but approximately 10 per cent of my cases, for this is about the proportion in which the normal amplitude of right arytenoidean swing has seemed to me to be deficient. For some years I removed both sacs in all cases, and the percentage of improvement and recovery was distinctly lower than it has been since I began to remove the right sac only when the arytenoid on this side *seemed* to have deficient movement. The double-sided operation doubles the danger of chondritis and thickening and ankylosis of the arytenoids. When the abductors of the right arytenoid are not parietic, even the removal of the corresponding ventricle does not fix this cartilage to the thyroid, as I have observed on numerous occasions when operating upon a roarer the second time. Three times during this present year I have done laryngotomy on horses that had been subjected between eight months and two years previously to a double-sided operation in which the "burr" had evidently been employed, and in each of these cases the right arytenoid seemed to have its normal amplitude of swing. It is to be noted that in these three cases the mouth of the ventricle was found intact, and the cord had not healed outward against the thyroid, but continued to present an obstructing ridge to the inspired air. The removal of the deeper two-thirds of the ventricle had not impeded the arytenoid's movements.

I believe that the right side is rarely involved, even though I operate upon it in about 10 per cent of my cases. Postmortem inspection of the posterior and lateral cricoarytenoideus muscles should enable one to settle this question.

One or both ventricles having been removed, the blood is swabbed from the larynx and gently from the depths of the ventricle, and its interior is moistened with a 10 per cent solution of iodoform in sulphuric ether. The wound retractor is removed, and a specially constructed aluminum tracheal tube armed at the end with 4 inches of stiff white rubber tubing is inserted and fixed in the lower commissure of the wound between the cricoid and first tracheal ring by means of a tape passing

through the edges of the skin in front of the tube. The middle of the tape is drawn through an eye in the front part of the plate of the tube, where it passes around a leather button or keeper. The ends of the tape are then tied in a bow-knot in front of the tube.

The advantages claimed for this form of tube for this operation are:

1. The tube is light in weight.
2. It can not become displaced.
3. It does not occupy any part of the larynx even when the head is strongly flexed upon the neck.
4. The rubber tubing projecting from its intratracheal end keeps the tube parallel with the lumen of the trachea, prevents its upsetting, and so softens the end of the tube that no wounding of the tracheal mucosa can occur.
5. It is easy to remove and to introduce.

As soon as the patient begins to struggle the hobbles are removed. No food for two or three hours. Afterwards for the ensuing four weeks the patient is restricted to walking exercise in box-stall or at the lead, and is fed lightly as any horse out of work. The tube should be removed daily, cleansed and replaced. Usually if the operation has been one-sided the tube may be removed on the morning of the fourth day and left out. The horse should be watched closely during this day and on the occurrence of the slightest dyspnea the tube should be promptly replaced and continued for a few days. If, however, the horse passes the fourth day comfortably without the tube it should be replaced at night, removed on the fifth day, and if not needed during this day may be left out. Lymphatic animals require the tube for a longer period, as a rule, than do Thoroughbreds or thin-throttled horses.

During the fifth and sixth weeks following the operation the exercise should be confined to walk and slow trot on lunging line, hitched to a light vehicle or under the saddle. After six weeks the horse may do his regular work, because the cicatrix should be so strong that forced respiration will not break it.

The time required for complete contraction of the cicatricial tissue at the site of the stripped ventricle varies within narrow bounds, but is approximately four months. Of those which are cured the great majority have lost the objectionable inspiratory sound and the accompanying dyspnea in six weeks. A few will

exhibit rough breathing at first, but lose it gradually and entirely during the succeeding three to five months. Rarely a horse will remain sound of wind for eight to twelve months following the operation and then will slowly develop inspiratory stridor, due in the few cases that I have examined either to exuberant granulations at the seat of operation, a mucous cyst, or a moderate, slow chondritis, especially of the upper or pharyngeal border of the arytenoid.

As to the danger of cricotomy in the production of a chronic deforming chondritis, I am satisfied that it has been inordinately magnified. I always section the cricoid. Twenty-six per cent of a series of 500 cases with which I kept in touch for five to six months after operation were either improved only to the extent of being serviceably sound or were worse. Undoubtedly many or most of these developed a chondritis, but what proportion arose from perichondritis of the arytenoid and thyroid, and what proportion from section of the narrowest part of the cricoid, I have no means of knowing accurately. From numerous inspections of the interior of larynges of living horses affected with laryngeal chondritis, and careful examination of a few larynges on postmortem, I have been impressed by the fact that the hyperplasia of cartilage was most pronounced in the arytenoid and particularly in its superior spongy half. It was present in less degree in the wide and thick deeper half of the cricoid. In these cases the arytenoid was ankylosed to the cricoid and so thickened as to project into the lumen of the larynx by its anterior and superior borders.

For a short distance on either side of the point of section of the cricoid the latter showed no thickening. In most cases the sectioned ends of the cricoid were found separated by the width of the tip of the index finger, were small, in fact of normal size, and covered with connective tissue. In a few cases the ends of the cricoid were in contact, and at that point there was calcification, forming a lump the size of an ordinary pea, but no observable thickening for an inch or so on either side. It is improbable that infection entering at the exposed ends of the sectioned cricoid manifests itself only at some distance in this and contiguous cartilages.

My reasons for cutting the cricoid are:

1. The larger wound prevents absolutely the aspiration of food particles, saliva, pus, etc., through the trachea to the lungs.

Among more than 700 cases which I have operated upon since 1906 there has not been a single case of inspiration pneumonia.¹

2. In the hands of the average operator the "burr" does not remove the mouth of the ventricle, but leaves a pocket which will admit the end of a finger. I believe the burr when skilfully used will evert the entire sac, but I know that few learn to do it properly. If students are taught the dissection method alone they must remove the mouth of the sac, the most difficult part by any method, and the fundus comes away easily. This dissection method is impracticable through an incision confined to the crico-thyroidean ligament.

3. Through the larger wound the entire interior of the larynx is open to inspection and to a free and methodical surgical procedure.

4. To my mind, the advantages gained far outweigh the possible complications ensuing upon section of the cricoid.

In conclusion I submit a summary of statements elicited from the owners of 500 horses operated upon between 1906 and 1915. In a questionnaire sent out at least five months after each operation, I asked the following questions:

1. Five months after operation was your horse in your opinion perfectly cured?

2. Five months after operation was your horse merely improved; that is, made serviceable to hunt, run, jump or pull, but with noisy breathing, or a troublesome cough?

3. Was your horse practically unchanged by the operation, or worse?

From 548 such letters I received 500 replies. Of these 355 (71 per cent) answered the first question in the affirmative. Ninety-seven (19 per cent plus) stated that their animals were made serviceable but remained noisy. Forty-eight, or 9.6 per cent, were either no better or were worse after operation.

	Horses.	Percentage.
Cured	355	71
Improved	97	19.4
Same or worse	48	9.6
Total	500	100

There were no deaths nor injuries attributable in any way to the operations other than the havoc I wrought in some of the 48 larynges of the unsuccessful cases.

¹ Chloroform pneumonia (1 case) excluded.

In this series are included somewhat over 20 animals in which I recognized chondritis before operating. I think the number was 23, but I am not sure. None of these cases were benefited; most were worse. I do not now operate when this condition is recognized. Had these, say, 20 cases been excluded, the results would have been:

	Horses.	Percentage.
Cured	355	74
Improved	97	20.2
Same or worse	28	5.8
Total	480	100

In the next series of somewhat over 200 cases, the results of which I know only in part, I lost 3 horses. One died within twenty-four hours from pulmonary congestion; a second died within a few hours, showing intense cerebral or meningeal irritation, both deaths the result of faulty administration of the chloroform. A third horse, after operation upon the table, had paraplegia—a broken back.

Dakota Farmer discusses the Government analysis of the runt situation and declares: "You will note that runts are not due to a law of nature but are caused by circumstances that the owner can prevent."

Argentina has only about one-tenth as many farmers as the United States, but she produces about one-third as many cattle, one-third as many horses, and nearly twice as many sheep. It is only in hogs that the Argentine farmer falls decidedly below the American farmer. * * * Learn everything you can about Argentina. She is our great competitor."—*Wallaces' Farmer*.

In noting the purchase of 250 horses from the King ranch, Texas, by a Mexican general staff officer, the *Brownsville Sentinel* says: "They are larger and stronger than the average horses and, because of the similarity of climates are more adaptable than horses bought in the northern and central parts of the United States."

ICTERO-HEMOGLOBINURIA IN CATTLE ¹

By EDWARD RECORDS and LYMAN R. VAWTER

University of Nevada, Reno, Nevada

THE DISEASE of cattle to which we have provisionally given the designation of ictero-hemoglobinuria, more commonly known in the districts where it occurs as "red-water disease," appears in the light of recent developments to be more widespread in its occurrence and therefore of more general interest than was at one time supposed. While primarily a disease of cattle, our attention was recently called to a case in a sheep which showed symptoms and lesions identical with those in bovines. This disease is now known to occur widely over the Pacific Coast and the western portion of the intermountain country, its presence having been conclusively demonstrated in western Nevada, the adjoining portions of California, and in Siskiyou, Shasta, Marin and Los Angeles counties in the latter State. In Nevada, at least, it is known to have been present for from twenty to twenty-five years, though not attracting marked attention until rather recently. Its presence has also recently been demonstrated in Oregon.

While spectacular outbreaks involving a large number of animals simultaneously or within a short period of time in the same herd are infrequent, they do occasionally occur. The more usual history is the loss of an occasional animal throughout the season, such losses often extending over a long period of years on the same ranch. In the aggregate, of course, losses of this sort are economically as serious as acute outbreaks more likely to attract marked attention.

The disease has received intensive study at the Nevada Agricultural Experiment Station since 1914, and has also been the subject of considerable investigation by various workers in California. The literature dealing with the subject, however, is rather sparse. An article by Dr. K. F. Meyer, "Studies to Diagnose a Fatal Disease of Cattle in Mountainous Regions of California," appeared in the JOURNAL OF THE A. V. M. A. in February, 1916. Dr. J. P. Iverson presented a paper on this

¹ Presented at the fifty-eighth annual meeting of the American Veterinary Medical Association, Denver, Colo., September 5-9, 1921.

disease at the Los Angeles meeting of the California Veterinary Medical Association in 1916, and Doctors Mack and Records presented a paper entitled "Studies of an Obscure Cattle Disease in Western Nevada" at the Kansas City meeting of this Association in 1917. This is apparently about all that has appeared dealing specifically with the condition under consideration. Since the presentation of the latter paper a great deal of work has been done at the Nevada station, and it is some of the developments in this work since that time that it is desired to present in this paper.

Limitation of time will not permit of a very detailed presentation of what has been done, and some aspects of the work will have to be almost entirely ignored at this time, to be dealt with later in fuller detail in a publication on this subject.

The clinical manifestations and gross pathology of this disease are very well set forth in considerable detail in the papers by Meyer and Mack and Records referred to, but it is perhaps essential to review them briefly after this lapse of time.

The typical clinical symptoms shown from the time cases are usually discovered are as follows: Appetite, rumination, milk secretion and bowel movements are suddenly suspended. The animal stands apart from the herd, with its back arched and abdomen tucked up. The coat is dry, lusterless and staring. The animal is loath to move and may grunt with each step. The facial expression is distressed; the eyes have a characteristic sunken appearance. Respiration is moderately accelerated and of a shallow costal type; a characteristic grunt usually accompanies each expiratory movement. The muzzle is dry and hot. The visible mucous membranes are icteric, but may assume a pigmented reddish color. Generally there is a marked rise of temperature during the outset of the attack which may reach 106. The temperature drops later and may be subnormal for a considerable period before death. The pulse is increased in frequency but is thready. Venous pulse is very pronounced. As the disease progresses, bowel movements become very active, with frequent passages which are soft, small in amount, and range from slightly catarrhal to almost pure blood. Urination is frequent and copious; there is well-marked hemoglobinuria, the urine usually attaining a deep garnet color. This continues until the animal suddenly collapses and dies after a brief agonal period.

The clinical blood picture manifests a rapid destruction of erythrocytes with hyperleucocytosis, the erythrocytes diminishing to two million or lower, a destruction of approximately 65 to 70 per cent of the number normally carried by cattle in this latitude. The leucocyte count is high, averaging 40,000. A high degree of hemoglobinemia accompanies this pathological blood change.

The duration of illness after detection ranges from a few hours to a few days, averaging perhaps thirty-six hours. The mortality is very high, over 90 per cent at least, in cases marked enough for reasonably certain diagnosis.

The lesions found at postmortem are strikingly uniform within certain well-defined limits of variation. Rigor mortis develops rapidly after death. Bloody mucous discharges from the nostrils and anus are observed. The conjunctiva is icteric and may exhibit a reddish pigmented color. There is marked cadaveric icterus. Numerous petechial hemorrhages are found in the subcutis. Occasional cases manifest pronounced localized hemorrhagic edema and exudation in the subcutis along the sides of the neck and shoulders.

The abdominal cavity contains a varying amount of hemorrhagic transudate, in some cases as high as two liters. The omentum, parietal peritoneum and mesentery are extensively mottled with ecchymotic and profuse hemorrhages and diffuse imbibition around the blood vessels. The connective tissue of the duodenal loop and the colon manifests a hemorrhagic edema. The entire omentum is quite frequently flecked with reddish fibrin deposits. The serosa of the intestines is brick red in color.

The wall of the duodenum is thickened and edematous, occasionally manifesting a fibrinous adhesion to the liver. The contents may be either deeply bile-stained or bloody. The lining epithelium is desquamated and shows numerous submucous hemorrhages.

The jejunum, ileum and colon contain either viscous bile-stained or blood-stained material. The lining epithelium is desquamated and may show numerous deep erosions. Submucous hemorrhages are constantly observed. The regional lymph nodes are swollen, edematous, and manifest a reddish pigmentation of the cortex. The abomasal mucosa is congested and sometimes manifests petechiæ.

The liver is always enlarged, icteric in color and soft in con-

sistency. A large infaret resulting from thrombosis of the portal vein is always found on the parietal surface, usually at the upper or lower extremity. The infaret on incision is irregular in outline and the thrombus of the portal vessels supplying the infaret area is readily observed. The serous surface of the gall bladder manifests diffuse areas of bloody imbibition and in some cases fibrinous exudate. The bile is excessive in quantity, dark in color, and contains many coarse flocculi.

The spleen is usually normal in size and in most cases slightly soft in consistency. On the capsule well-defined ecchymoses are observed.

The kidneys are dark brown in color with numerous punctate hemorrhages in the cortex. The medullary portion manifests a diffuse reddish color and a streaked appearance. The kidneys are friable and bloody fluid is apparent on incision. A very high degree of hemoglobinuria is always noted. The serosa of the uterus often manifests petechiæ. The subcutis and viscera of the fetus exhibit hemorrhages very similar in character and location to those in the cadaver of the mother.

In the thoracic cavity varying amounts of fluid are found in both sacs; in the majority of cases it is deeply blood-tinged. The parietal pleura may have fibrin deposits which are reddish in color. Subpleural hemorrhages varying in extent from petechiæ to diffuse suggillations are very common. The lungs in a majority of cases manifest a slightly reddish pigmented color which changes to a decided icteric color on exposure to air. Edema is present to a varying degree. The trachea, larynx and pharynx manifest either petechiæ on the mucosa or diffuse bloody imbibition. The regional lymph nodes are swollen and oedematous, manifesting reddish pigmented color. The pericardium manifests suggillations or petechiæ and the pericardial fluid is deeply blood-tinged. The epicardium manifests petechiæ and hemorrhagic extravasations, particularly along the coronary vessels and auricles. The endocardium of the left ventricle always exhibits more or less diffuse subendocardial ecchymotic hemorrhages, occasionally suggillation in type. The myocardium is turbid and friable.

The brain and meninges manifest extensive perivascular hemorrhages, but to lesser degree than noticed in other parts.

At first confused with anthrax, later with hemorrhagic septicemia, but now apparently conclusively proven to be a dis-

tinct disease entity, the specific etiological factor or factors in this disease are still not absolutely demonstrated. The striking and uniform lesions found in the liver of these cases would seem to point very strongly to a more or less specific infection which established itself at that point, gaining entrance from the digestive tract either by way of the portal circulation or the lymphatic system.

Disregarding the extensive work done at this station earlier in the investigation of this disease largely in an effort to demonstrate it as being an atypical form of hemorrhagic septicemia, our bacteriological studies have been to a great extent concentrated on this liver lesion, supplemented by general cultural work throughout the carcass, carried on collaterally with it. During the last two years these studies have stressed particularly the anaerobic organisms found, and the bacterial flora of this group has been found to be, as a rule, quite constant, after making suitable allowance for the age of the material examined and the conditions under which it was obtained and transported.

Briefly summarized, these bacteriological findings are as follows:

Bacillus botulinus was recovered in four cases from the liver infarcts; type B in two cases on one ranch; type A from a case on an adjoining ranch, and from another case on a ranch several miles distant but directly connected with the other two by drainage water. Other organisms were associated with it.

B. oedematiens was recovered from the liver infarct of one case associated with other organisms. *B. histolyticus* has also been encountered, as have some other not definitely classified anaerobes.

Colon organisms of the coli-aerogenes and *B. communis* types are frequently found as secondary invaders. A Gram-positive diplococcus apparently belonging to the Type IV pneumococcus group is encountered in every case. *B. sporogenes* has been isolated from the liver infarct in a majority of cases.

B. welchii, Type IV, has been found in every case where the cultural methods used and the conditions under which the work was done were such as to make the recovery of this organism possible. It can be recovered not only from the liver infarct but from the portal, mesenteric and mediastinal lymph glands, spleen and heart muscle. In no naturally occurring cases, however, have we been able to recover this organism from the blood

stream, the tendency being apparently for localization, particularly in the organs mentioned. This is the only organism recovered which has shown the presence of hemolytic properties, a fact which, taken together with its uniform presence, has led us recently to concentrate our attention upon it as the possible bacteriological cause of this disease. It may be fitting to mention that no cadaver was considered for bacteriological study which had been dead over four hours. Animals manifesting typical clinical symptoms were killed for experimental bacteriological study. *B. welchii* was isolated from liver infarct, spleen, mesenteric and mediastinal lymph glands and heart muscle.

All of the organisms recovered which proved pathogenic for small laboratory animals, and some of those which did not, were used for cattle inoculations in the attempt to reproduce the disease. *B. botulinus* and its elaborated toxins proved highly pathogenic for cattle, but caused only typical symptoms and lesions of botulism, producing nothing simulating the natural cases of this disease.

B. oedematiens proved highly pathogenic for cattle, animals succumbing in fifteen hours following injection of small quantities of culture into the mesenteric veins by means of a laparotomy. The latter procedure was carried out in an effort to simulate the supposed natural channel of infection as closely as possible. While the lesions produced were suggestive of this disease as it naturally occurs, they were not as much so as were those produced by *B. welchii*, which will be dealt with later; and this fact, together with the finding of this organism only once, led to its dismissal as a possible causative factor.

B. welchii administered orally to four cattle in doses as high as 1,000 mils of culture daily for one week produced no effect beyond a slight diarrhea which could readily have been induced by the amount of foreign material contained in the culture ingested. Direct inoculation experiments were, however, more encouraging.

Approximately 30 head of yearling and 2-year-old cattle were given 25 to 35 mil doses of a 24-hour glucose-meat media culture deep in the muscles of the thigh. All of the animals developed more or less extensive edematous swellings at the site of injection, and of this number two developed decided hemoglobinuria, icteric visible mucous membranes, sunken eye appearance,

constipation followed by diarrhea and great depression entirely typical of natural cases. Blood examinations made after the development of hemoglobinuria also corresponded closely to those made on natural cases. The erythrocyte count fell as low as 3,000,000, as compared with the average normal, which in our locality is known to average about 6,000,000.

The postmortem lesions, while not absolutely identical with those of natural cases, were as close as could be expected, considering the different method of infection. The general cadaveric icterus, subserous hemorrhagic edema and hemorrhages were present. The liver infarcts were small and multiple but typical. The retained bile in the distended gall bladder was tarry in color and flocculent. Kidneys manifested the typical dark color with numerous cortical hemorrhages. The bladder was distended with dark garnet-colored urine. The lungs showed a reddish pigmented appearance and were slightly edematous. The heart manifested the typical petechial epicardial hemorrhages with the diffuse subendocardial hemorrhage in the left ventricle. The lymphatics manifested a reddish pigmented color and were edematous. We feel that the multiplicity and small size of the liver lesions is amply accounted for by the different channel of infection. None of the other organisms recovered that were used for inoculation experiments proved pathogenic for bovines.

Dr. F. W. Wood of Berkeley, working independently on cases of this disease occurring in California, has informed the writers in personal communications that he also has isolated *B. welchii* almost uniformly when suitable material was available for examination. Inoculation experiments on bovines performed by Dr. Wood with the strains isolated by him also produced results apparently about identical with our own.

The findings so far made in connection with *B. welchii* seem to indicate quite strongly that this organism may prove to be responsible for the clinical symptoms and lesions seen in these cases. The fact that *B. welchii* is not found in pure culture does not exclude this possibility, the importance of the adjuvant role of nonpathogenic aerobes and anaerobes in *B. welchii* infections being clearly pointed out by the Committee on Anaerobic Bacteria and Infections, Special Report, Series 39.

Before forming a definite conclusion, however, as to the actual etiology of this condition, certain reservations should probably

be kept in mind in this connection with regard to *B. welchii*. This organism is well known to be practically world-wide in distribution and may be even more plentiful in nature in parts of the world other than where this disease occurs. Also the strains isolated by us do not appear to have any unusual pathogenicity for bovines, as evidenced by the comparatively small percentage of deaths among animals inoculated with really large doses as practiced by us.

It would seem, therefore, most probable that there is some as yet undetermined predisposing factor or factors which make it possible for this organism to assume invasive properties and establish itself in the living tissues of apparently normal animals. Just what these factors are, it will probably require considerable additional study to determine. Some of the apparently predisposing conditions are, however, already fairly well established and may be briefly outlined as follows:

Generally speaking, the disease is more or less a seasonal one, cases beginning to appear in late spring or early summer and increasing in frequency throughout the warm season, being most numerous at the end of the summer or early fall and practically disappearing by December. There are occasional exceptions to this, cases occurring in the dead of winter.

There also seems to be a very close connection between telluric conditions and the occurrence of this disease. The premises where the most serious losses occur are almost invariably those lying at the bottom of a more or less extensive drainage area where surface and superficial underground water collects with no natural point of outlet. On many premises the disease appears only in the late summer when the sloughs and natural pools reach their maximum of stagnation and concentration. Moving back from these areas toward the foot-hills, there seems to be a progressive diminution both in the number and the severity of the cases, the percentage of recoveries being higher. Once out of the irrigated areas on the dry open range, the disease does not occur, at least to any appreciable extent. There are, it is true, occasional exceptions to this, cases occurring in feed lots when the cattle are on hay and receiving well water. As a general thing, however, the hay in these instances is harvested on the same sort of land where the disease occurs among animals on pasture. It would seem, therefore, that there is a very close

connection between this disease and the presence of excessive amounts of what might be called dead water and relatively high temperature. The nature of the pasture itself does not appear to be a material factor, cases being almost equally frequent on natural wild hay meadows and alfalfa pastures.

The treatment of these cases can not be said to be on anything approaching a satisfactory basis at this time. In the absence of definite knowledge as to a bacterial cause, nothing which can be properly classed as a specific antiserum has as yet been used. Anti-hemorrhagic-septicemia serum has been used extensively, but we now know this material to have been nonspecific, and it will be considered merely as a serum in summing up this phase of the question.

As a matter of routine practice, it is found that the intravenous administration of horse serum in doses of 200 mls, preferably repeated several times at intervals of 8 to 10 hours, supplemented by the administration of fairly active but non-irritant purgatives, such as large doses of ground flaxseed boiled up in a liberal amount of water to which has been added a pound or less of sodium sulphate, is of benefit. Stimulants can apparently also be administered to some cases advantageously. Treatment such as outlined when started fairly early in the course of the disease appears to bring about a marked reduction in mortality, provided the case is not of an unusually severe and acute or fulminant type. Cases of this sort and those in which treatment is started rather late in the attack appear to be but little influenced by therapeutic measures of any kind.

Disregarding the extensive use of hemorrhagic septicemia bacterins and vaccines, which have proven valueless for reasons which are now quite obvious, this disease being in no way associated with infection by *B. bovissepticum*, very little has as yet been done along the lines of direct control by the use of biologics.

Recently when indications pointed more and more strongly toward *B. welchii* as an etiological factor, work was undertaken along the lines of specific immunization, using an aggressin prepared by inoculating young cattle with this organism in the same manner as is blackleg aggressin. We have to date treated approximately 1,200 animals with this aggressin in the districts where this disease usually causes the heaviest loss. Part of the

material so used was prepared and supplied to us for experimental use by Dr. Wood, and the balance was prepared in our own laboratories. As this portion of the work was undertaken only during the present season, it is too early to make any definite statement as to the results obtained, but present indications are that the use of this aggressin has afforded at least some protection, the percentage of cases occurring among the treated animals being appreciably less than among the untreated controls, an adequate number of which were left in each herd. Dr. Wood has also used this material to some extent in California, with what result we do not know.

The more general measures of control which seem clearly indicated by our observations on the occurrence of this disease are unfortunately impracticable on account of the great expense involved. To drain the lands properly where excessive water is now present either as a result of natural conditions or unjudicious irrigation in the past would require in most cases engineering work of considerable magnitude. What it has been possible to do along this line on some ranches in the way of keeping cattle out of pastures where excessive water was present, and the practice of more careful irrigation so that dead water was not allowed to accumulate, has apparently resulted in a material lessening of the losses, and such procedures are certainly indicated in the light of our present knowledge.

It is of course obvious that if some thoroughly effective means of specific immunization could be devised it would afford by far the cheapest and most practical means of controlling this disease, placing it on a par with anthrax and other diseases which are now so well held in check in this way. Unfortunately the use of the aggressin referred to above does not give any present promise of being feasible on a large scale, even if it should prove effective in preventing the disease, owing to the fact that the very small percentage of successful inoculations of cattle with *B. welchii* for its production would make the cost almost prohibitive. This may, of course, be overcome by the devising of some more satisfactory technique for its preparation. The success of this aggressin would, of course, in any event, depend entirely on *B. welchii* being the actual causative factor in this disease.

SURGICAL TECHNIQUE—SUTURING¹

By H. E. KINGMAN

Professor of Veterinary Surgery, State Agricultural College of Colorado, Fort Collins, Colo.

IN presenting this paper, it is to be understood that no attempt has been made to cover completely the subject under discussion. The writer is anxious to present the cases in mind in such a manner as to interest his fellow surgeons, leaving out all details that might be essential to a group of students or others less able to grasp the context than those for whom this paper is intended. It is presumed that we are past the basic steps and are interested only in solid facts. In this paper I hope to present and illustrate a phase of technique that has been very useful to me and I am sure can be to others.

Suturing enters as an important factor in nearly every operation, and frequently occupies as much time as incision, dissection and hemostasis. In Cæsarian section, for example, one's time is principally taken up in suturing. Many other operations demand an equal amount of attention to uniting the wound. Next to cleanliness, the operator is most concerned in thoroughness or carefulness, but following these in importance comes speed. A patient can withstand a severe operation, provided the animal is not made to endure it for a long period of time and given large amounts of anesthetics or restrained in a cramped position. The time element enters in as a matter for careful consideration in conserving the strength and resistance of the patient and in obviating surgical shock. Speed in suturing goes a long way toward reducing the length of time that the patient must remain under restraint or anesthesia.

With the idea in view of improving our technique in suturing, I wish to present several methods of tying knots.

It is to be remembered that the hands are frequently covered with blood and that securing the ends of the suturing material is liable to consume more time than it should.

The needle having been passed through both margins of the wound, it is held with the needle holders in the right hand.

¹ Presented at the fifty-eighth annual meeting of the American Veterinary Medical Association, Denver, Colo., September 5-9, 1921.

The free end is picked up with the thumb and finger of the left hand and the opposite suture grasped with the second and third fingers. The sutures are then crossed until the free end may be drawn under by the second finger; releasing the hold with the thumb and first finger makes the first part of the knot. The free end is again grasped by the thumb and first finger, the second and third fingers are laid with the palms up, while the needle end is crossed over again and the second finger draws the other end under, completing the knot.

Forceps may be used instead of fingers. The following method is preferred by many operators. We call it the two-forceps method. After passing the suture through both margins of the wound, the suture is wrapped around the end of thumb, forceps held in the left hand; the free end of the suture is then grasped with the forceps and drawn through the loop. The same thing is repeated in the opposite direction, completing the knot.

The four-forceps method is less practicable than the first two described, but is very useful when skilled assistance is available. The assistant grasps the needle end of the suture three inches above the wound with the forceps in his right hand; he then ties the first part of the knot the same as in the second forceps method. The operator then completes the second part of the knot by the same process.

I wish to describe in detail the application of three sutures that have proved to be especially useful. The first of these was the so-called interrupted mattress suture. Its advantages lie largely in the fact that it brings into apposition raw surfaces, turning the external surface away from the margin of the wound.

To illustrate one instance in which the mattress suture is particularly adapted, I wish to discuss the treatment of split ears. The split ear is of common occurrence and wherever barbed wire is found. However, this is not the only offender. One was brought to our attention in which a Jersey bull split his ear for a length of four or five inches on a nail, giving him a very unsightly ear, especially if he was to be used for show purposes. It is seldom advisable to attempt suturing an accidentally split ear until the edges have completely healed. The operator may then have a clean field upon which to work.

The technique consists in preparing the field in the usual manner; the entire ear is scrubbed with Dakin's solution, and the area lathered with tincture of green soap. The hair should

be shaved from both sides of the ear for at least a space of half an inch in width. Anesthesia consists in chloral enough to quiet the animal. Some beneficial results have been obtained from the use of apothesine over the posterior and internal auricular nerves. A sterile sheet with a hole in the center is placed over the head and the ear drawn up through the hole. All instruments should be sterile, as well as the operator's hands. An incision is made on the edge of the healed surface, exposing two flaps of skin and the yellow fibrous concha. The flaps are loosened to the extent of one-fourth inch and the protruding concha removed the entire length of the incision. The operation is repeated on the opposite side. The cutaneous surfaces are then united up by means of mattress sutures of linen, one-half inch apart. By this method the fresh surfaces are maintained in apposition. The inside and outside of the ear are sutured separately. The united surfaces are then covered with a solution made of gum mastic in benzol. At the end of three days the suture should be examined for signs of infection. Then if moisture is present or if there are other signs of pus, the infected suture should be removed and the wound bathed in alcohol or 1 per cent of tincture of iodine. Under ordinary conditions the wound unites by first intention. Occasionally a few of the sutures must be removed or treated with alcohol, but if given the proper attention small infected areas need cause no alarm. In fact, cases have been operated upon and given no further attention after the first day and made complete recovery, although a few of the sutures became infected.

I should like to call attention in detail to two other methods of suturing. The first of these is a continuous peritoneal and subcutaneous suture, used especially in small animals where the peritoneum and abdominal walls are to be closed.

The thumb forceps lifts the peritoneum on the right side away from the viscera, and the needle is passed through the muscle and peritoneum. The peritoneum of the left side is then lifted and the needle passed through the peritoneum and muscle from beneath. The suture is then grasped with the fingers or forceps, drawing the peritoneal surfaces together and lifting them so that the needle may pass through both at the same time. This is repeated until the peritoneal wound is closed by a simple continuous suture. The skin is then grasped and held, while a

subcutaneous suture is placed in it. This suture is then carried continuously from one side to the other until the skin wound is closed. The two ends of the suture are united by a surgeon's knot. If No. 1 gut is used, the knot should be small enough to be completely hidden.

The second is the mattress suture as used in closing the wound and hernial ring in the treatment of ventral hernia.

An elliptical incision is made over the fundus of the sac and the skin carefully removed, exposing the serous sac. This separation of cutaneous and serous coats is continued until the hernial ring is reached. The tunic and fascias forming the ring are firm and may be easily recognized by the sense of touch. One frequently encounters a thick layer of fat lying close to the hernial ring, which impedes the progress of dissection. Hemorrhage should be slight and is easily controlled by means of sponge and forceps. One should avoid sponging as much as possible, since it is a common source of infection. Repeated wiping of the tissues lowers their resistance and inhibits repair.

The next step consists of preparing the flaps of fascia for suturing. One begins by splitting the margin of the ring as close to the parietal peritoneum as possible, taking great care not to invade the peritoneal cavity. The flaps should be one-half to three-fourths of an inch in width. A full curved needle threaded with No. 4 catgut is then passed down through the left flap at a point one-half inch from its margin, down through the margin of the opposite flap, then up through the margin of the same flap and up through the left flap one-fourth of an inch from the starting point. This constitutes a mattress suture. Repeat the sutures over the length of the hernial ring. The sutures should then be drawn tight. This will force the right flap beneath the left, causing them to overlap one-half inch. The free margin of the right flap should then be sutured to the left surface by means of a continuous suture. The skin should be sutured with a mattress suture, bringing into apposition considerable denuded surface.

A place for drainage is left at the anterior commissure of the cutaneous wound. One may insert a strip of gauze to be removed at the end of 12 hours. The entire wound, except the place for drainage, is covered with gum mastie and gauze. The wound will unite by first intention if reasonable care has been observed to avoid the introduction of infection. The skin su-

tures may be removed in about five days; the catgut sutures are permitted to take care of themselves.

The advantages of this technic over some of the others commonly used are that the peritoneal cavity is not invaded, and further, that the overlapping of the fascias insures a permanent union and obliteration of the hernia. Also there is no danger of injury to intestine or other viscera. If one should fail in the matter of asepsis, there is little to fear from peritonitis, since one has only a wound of the skin and subcutaneous tissues to treat.

In case of infection, one or two skin sutures should be removed and the wound dressed with Dakin's solution, or a 2 per cent alcoholic solution of iodine.

HORSES AND MULES IN WAR

In public recognition of the important services performed by horses and mules in the United States Army during the war, a large bronze tablet has been placed on the east wall of the State, War and Navy building, Washington, D. C. It depicts a field artillery piece drawn by four spirited horses, with their riders and two cannoneers on the field of battle, and makes a vivid picture of action. Underneath in raised bronze letters is the following descriptive inscription:

"This tablet commemorates the services and sufferings of the 243,135 horses and mules employed by the American Expeditionary Forces overseas during the great world war which terminated November 11, 1918, and which resulted in the death of 68,682 of those animals. What they suffered is beyond words to describe. A fitting tribute to their important services has been given by the commander-in-chief of the American Expeditionary Forces, Gen. John J. Pershing, who has written: 'The Army horses and mules proved of inestimable value in prosecuting the war to a successful conclusion. They were found in all the theatres of preparation and operation doing their silent but faithful work without the faculty of hoping for any reward or compensation.'

"This tablet is erected by friends of the horse and mule in the United States, under the auspices of the American Red Star Animal Relief, a department of the American Humane Association."

SOME DISEASES OF THE DIGESTIVE TRACT IN DOGS AND CATS¹

By F. H. McNAIR

Berkeley, California

ASIDE from the sentimental viewpoint, it seems to me that it is well worth while from an economic standpoint to relieve the ailments and prolong the lives of man's faithful allies and companions, the dog and the cat. Cats yearly save to mankind much valuable material by killing rats and mice. The usefulness of the dog is varied, but one of his chief offices is that of private policeman. Many a house, especially in our cities, has been protected from burglary by the family dog. So let none of us consider these animals as beneath his professional dignity.

FOODS

Since much sickness in pet animals is caused by improper feeding, let us consider briefly the subject of proper foods.

Many breeders and others believe that dogs and cats, being by nature carnivora, should be fed entirely upon a raw-meat diet. It is true that a generous diet of raw meat will cause rapid, thrifty growth in puppies and kittens and make them salable in the least possible time. But if such a diet is continued indefinitely the animal will sooner or later become diseased. The advocates of meat feeding overlook the fact that in the wild state dogs and cats are obliged to exercise considerably in hunting their food, while our domestic animals are usually overfed and underexercised. Many dogs and cats are successfully raised and kept in good condition on a mixed diet that contains a minimum amount of meat. Also heavy eaters of meats are more inclined to be vicious than are non-meateaters. In short, the feeding of meat should always be governed by good judgment.

Though an occasional feed of liver may be permissible, an exclusive diet of it is usually more injurious than other forms of meat, because of the concentrates and waste products contained in it. Bones, except in the form of bone meal, should not be fed unless they are large bones that can not be chewed down. Milk

¹ Presented at the fifty-eighth annual meeting of the American Veterinary Medical Association, Denver, Colo., September 5-9, 1921.

in the ration of both dogs and cats is usually permissible, provided the animal can retain it.

In order to lessen the tendency to eat poisoned or tainted food on the outside, my patrons are usually advised to feed their cats and dogs twice a day, one light and one fairly heavy meal.

Foods we have found satisfactory are: Dog biscuit and its derivatives; the various mushes, except that oatmeal and cornmeal must not be fed in too large amounts, especially in hot weather; boiled rice; macaroni; stews containing a small amount of meat but plenty of such vegetables as carrots, turnips and cabbage, little if any potato. Stale bread, if fed dry, may be tolerated, but we have found that the continuous feeding of potatoes or soaked-up bread usually causes a trouble—some diarrhea in both dogs and cats.

For bulldogs and other large breeds we find an excellent food consists of a prepared meal which is mixed with cold water and baked in a slow oven for 1½ hours. This meal is a combination of oatmeal, cornmeal, wheat meal, barley meal, soya-bean meal, blood meal and fish meal.

DISEASES

The diseases to be considered are only those that I consider of the most importance, and the cases cited are those that have occurred in my own practice.

THE TEETH

The teeth of both dogs and cats should be occasionally examined and any accumulation of tartar should be removed so as to prevent sore gums and decay of the teeth. It may at times be advisable to fill small tooth cavities, but as a rule when the veterinarian sees the case decay is so far advanced that extraction is the better procedure. In making extractions considerable distress to the patient and owner can be avoided by injecting the gums with a nontoxic anesthetic. Of course this should command an extra fee, which will be cheerfully paid by many owners.

In one dog recently treated an aggravated case of articular arthritis was apparently due to the absorption of pus from 12 badly decayed teeth.

TUMORS

Papillomas often found on the mucosa of the cheeks of dogs usually yield to surgical removal and cauterization, but in one

dog under my observation they later developed a malignancy. Surgical removal or treatment of malignant tumors in any portion of the digestive tract seems useless, and to save suffering the chloroforming of the animal should be advised. One case can be mentioned of a dog with cancer of the jaw. The growth was removed three times within two months, but to no purpose.

HARELIP AND CLEFT PALATE

These deformities often occur in the same individual, and while harelip alone may be successfully operated upon, my experience with both conditions has been discouraging.

RANULA

This cystic tumor underneath the tongue usually yields to surgical removal, though in one cat so treated the operative wound refused to heal.

NECROTIC STOMATITIS

In my experience simple stomatitis is uncommon, and the necrotic type, although evidently infectious, seems to occur sporadically. The infecting agent is possibly *Bacillus necrophorus*, though why it should attack some animals and not others is a puzzle. Weak, debilitated dogs are supposed to be the most susceptible to the disease, but in my practice it has occurred largely in apparently strong, healthy dogs. One case in mind was that of a large, vigorous collie dog, which, on returning from a tramp in the hills with his owner, drank freely of stagnant water. The next day he was out of sorts, and three days later necrotic stomatitis had developed and in a week's time it proceeded to a fatal end. Other cases have developed apparently after the eating of garbage.

The symptoms are uniform and easily recognizable. In the early stage the gums are red, swollen and sensitive; there is some salivation and a temperature of 2 to 4 degrees above normal. In a few days ulcers develop on the gums and cheeks, there is almost a continuous flow of saliva of a stringy, sticky character, often blood-stained, and the odor is intensely disagreeable. The ulcers soon extend to the stomach and intestines; diarrhea usually occurs; the temperature becomes subnormal, the animal grows rapidly weaker and dies.

The writer has tried many forms of treatment, but with suc-

cess in only a few cases. The successful treatment consisted in swabbing the visible ulcers with tincture of chloride of iron and giving teaspoonful doses of the same, well diluted with syrup, every three hours, together with 4 c.c. hypodermic injections of 50 per cent alcohol three or four times daily.

FOREIGN BODIES

When in the esophagus foreign bodies may be removed by gently passing a probang, though as a rule it is safer to produce emesis with a hypodermic injection of 1-20 grain apomorphine.

Foreign bodies in the stomach are of great variety and may be removed by first giving a liberal dose of sweet oil as a lubricant, followed with a hypodermic of apomorphine.

Foreign bodies in the intestines must be regarded as very dangerous. I always advise against the feeding of bones, because frequently we find that a sharp bone has caused death by puncture of the intestinal wall. In old dogs especially, because of the lessened amount of hydrochloric acid secreted by the stomach, bones will pass through the gastro-intestinal tract undigested.

I wish to mention four outstanding cases:

Case 1.—A 12-year-old Irish setter dog with symptoms of impaction. By palpation an obstruction could be felt in the intestines. Large doses of oil, together with other physics and copious warm-water enemas, had no effect and the patient died. Postmortem examination revealed, lodged in the small intestines, a stony mass of partly digested bones 12 inches long and 2 inches in diameter. The mass was so hard that it required a blow from a hammer to break it.

Case 2.—A large 6-year-old collie, to which, in spite of previous trouble, the owner had continued the feeding of bones. The history was that he seemed perfectly well when turned out of the house in the morning, but half an hour later seemed to develop an extreme weakness of the hind legs. On examination the pulse was very thready and the visible mucous membranes were pale. Internal hemorrhage, following intestinal puncture, was the diagnosis. An hour later the dog was dead. Postmortem examination revealed the abdominal cavity filled with blood, and in the wall of the rectum was a tear 3 inches long. In the small intestines the passage of a sharp object, evidently a bone, could be traced by the denudation of the mucosa.

Case 3.—A 10-months-old Airedale dog with a history of good health till within a period of two weeks, when he developed an inability to retain food on his stomach. At the time of my visit the dog was in a dying condition from starvation, but I scoffed at the owner's statement that the trouble was due to a good-sized hard rubber ball that the dog had accidentally swallowed three months before. However, postmortem examination revealed such a ball, two inches in diameter, firmly lodged in the duodenum. Evidently the ball had remained harmlessly in the stomach for $2\frac{1}{2}$ months, but had finally been forced through the pylorus, effectually blocking the duodenum.

Case 4.—A 3-months-old Japanese spaniel puppy, suffering with constipation. Laxatives revealed the presence of numerous pieces of coal, and death finally resulted from a prolapse of the rectum. The owner stated that he knew of the pup's coal-eating habit, but did not consider it harmful, as the mother had always eaten coal!

HAIR-BALLS

Long-haired dogs and cats are quite apt to swallow considerable hair in the process of licking themselves, and are sometimes made dangerously sick by the accumulated mass. Owners of such animals should be advised to brush their coats thoroughly every day to remove the loose hair and also to give the animals a dose of sweet oil twice a week to prevent hair-balls forming. When other methods fail daily copious enemas of warm water will prove effective in removing hair-balls.

GASTRITIS

Gastritis may be acute, due to some temporary irritation, or chronic, when associated with some hopeless condition such as cirrhosis of the liver, often found in old dogs and cats. Acute gastritis is often due to overloading of the system with food, so that if the patient is not too weak a thorough washing out of the entire gastro-intestinal tract with a warm normal salt solution will often clear up the condition. Of course the patient should not be allowed to eat any food for several hours and to drink only small quantities of water. When food is given it should consist of beef juice, the white of eggs or a small amount of raw beef. Medicinal treatment should consist of bismuth and pepsin or sodium bicarbonate and extract of pawpaw. If torpidity

of the liver is suspected, good results can be obtained by giving small doses of calomel or aromatic cascara.

COLIC

Colic is often due to the presence of indigestible food, but may be caused by impacted masses of worms, which condition frequently causes the death of puppies. One peculiar case recalled was that of an 8-months-old Chow dog imported from China. Being a boarder, he was under our observation for four weeks, and during that time was in apparent good health. Suddenly one night he was seized with violent colicky pains, which continued until his death eight hours later. Large doses of morphine and chloral had no effect whatever. Postmortem examination revealed a severe inflammation of the small intestines. For a distance of 14 inches the intestinal wall was much thickened, and hanging to the mucosa were many hookworms of unusual appearance under the magnifying glass. Prof. Freeborn, Assistant Parasitologist of the University of California, discovered this hookworm to be *Uncinaria stenocephala*, a type hitherto unreported in the United States. This emphasizes the fact that on the Pacific Coast at least we must be on our guard against hookworm infestation in dogs.

CONSTIPATION

Old dogs and cats are very subject to constipation, but it can be controlled by rational feeding and regular doses of sweet oil with an occasional laxative pill.

DIARRHEA

Diarrhea is the most common and troublesome condition in the raising of puppies and kittens. It easily leads to an incurable chronic catarrh or fatal enteritis or prolapse of the rectum. The cause may be intestinal worms, improper food, or, what is quite common, the deadly patent worm medicines. Distemper also sometimes first manifests itself in this way.

The treatment should consist of small repeated doses of castor oil followed by bismuth to effect, or the following:

- | | |
|-------------------------------------------------|----------|
| (1) Tinct. opii camphoratæ..... | 1 dram |
| Misturæ cretæ | 2 ounces |
| Syrupus simp. q. s. | 3 ounces |
| M. Sig. 1 teaspoonful every two or three hours. | |

- (2) Milk of bismuth 2 ounces
 Elix. catnip and fennel 1 ounce
 Simple syrup q. s. 4 ounces
 M. Give $\frac{1}{2}$ teaspoonful every three hours.

Some cases yield to small doses of copper arsenite when other treatments fail.

The food should consist of boiled rice to which is added ground beef. No milk should be allowed in most cases, and then only if boiled. The indiscriminate use of patent worm medicines can not be too strongly condemned.

If in doubt as to the presence of worms in a dog or a cat, a small dose of arecoline, provided the animal's condition will warrant it, is often useful as a diagnostic agent.

ENTERITIS

Enteritis, especially when following distemper, is a discouraging condition to treat. I have had some good results when other measures failed by giving hypodermic injections of 50 per cent alcohol three or four times daily and by mouth a teaspoonful each of powered gentian and tannin suspended in simple syrup, the dose to be repeated two or three times daily.

HEMORRHOIDS

Hemorrhoids can often be controlled and sometimes cured by swabbing once or twice a week with 50 per cent solution of silver nitrate, freshly made. This sounds like drastic treatment, but in reality the pain following treatment is much less than if a 25 per cent solution is used. If the surface to be treated is large, the animal should first be anesthetized.

The operative treatment of hemorrhoids or rectal prolapse often results fatally because of the previous debilitated condition of the patient.

INFECTED ANAL GLANDS

Sometimes this condition can be corrected by simply emptying the glands by pressure between the thumb and index finger, and afterwards keeping the bowel movements soft with liberal doses of sweet oil. Often, however, it is necessary to open freely the glands with a scalpel and cleanse them out, later cauterizing with a silver nitrate pencil or swabbing with 25 per cent argyrol solution or tincture ferri chloride. A recurrence of the trouble must be expected in many cases.

RINDERPEST ("PESTE BOVINA") IN BRAZIL ¹

By G. A. ROBERTS

Clinical Veterinarian, Instituto de Veterinaria, State of São Paulo, Brazil

RINDERPEST had not been officially reported in Brazil until the present year, 1921. The origin of the present outbreak herein reported has not been determined. Some believe that it came with the zebu cattle from India that introduced the disease in Belgium on their way to South America, but this has not been proven. The first reports of cases of rinderpest in Brazil occurred at the plant of the Continental Products Company (Wilson & Co.) at Osasco, just outside the city of São Paulo, and the diagnosis of the disease was first made by the author. The infected zone was limited to a radius of a few miles from this point and included the city of São Paulo, a large, modern city of 550,000 inhabitants in the State of São Paulo.

About the first of the present year the Continental Products Company began losing some of their work oxen. These oxen were used about the plant and at night were inclosed in a small pasture near by. As it was not uncommon to lose an animal now and then, no note was made of the first cases, as to which animals succumbed nor as to where they came from. Since it was their practice frequently to introduce new work oxen into service from the cattle pens, the origin of the disease at their plant could not be definitely traced. Up to the present time no case has been reported outside of the infected zone about São Paulo.

Whether or not other cases occurred at the same time, or before those cases occurring at the Continental, we were not able to determine; but shortly after the epizootic broke out at the Continental, oxen which had been used by farmers of the neighborhood in hauling fertilizer from the plant began to die mysteriously, and the farmers themselves suspected that the source of the trouble was at the plant. During this time similar cases had been observed by various veterinarians and had been vari-

¹ Presented at the fifty-eighth annual meeting of the American Veterinary Medical Association, Denver, Colo., September 5-9, 1921.

ously suspected as anthrax and blackleg. Vaccinations against these diseases, however, did not stop the losses.

On the 5th of March I was called in by the Continental Company to see five sick oxen and to consult with their Federal Meat Inspector, Dr. Fosehini. Up to this time they had lost about twenty oxen. After observing the symptoms in all five, one was slaughtered for autopsy. By the gross pathological picture and also direct microscopic examination of tissues it was easy to eliminate anthrax and blackleg, but it was difficult to make a positive diagnosis. In my own mind the disease could be either rinderpest or hemorrhagic septicemia (intestinal form). The former, however, had never been reported in Brazil, and it was difficult to understand how the disease could appear first among work oxen about São Paulo.

Material was collected, therefore, and taken to Dr. W. G. Smillie, of the Institute of Hygiene of the Rockefeller Foundation, for bacteriological examination and small-animal inoculations. A bipolar organism of the pasteurilla group was easily isolated from spleen and liver, and guinea-pigs, white rats and rabbits died of a septicemia. Autopsies of these small animals showed a pure culture of bipolar organisms. Differential bacterial cultures on MacConkey's medium and all the various sugar mediums proved the organism to be one of the pasteurilla group. Therefore a hemorrhagic septicemia bacterin was made and the remaining six oxen vaccinated.

In the meantime other autopsies had been made. In spite of the bacteriological findings the symptoms of the disease and the gross pathology caused us to entertain grave suspicions of rinderpest. Four of the six vaccinated oxen soon died with typical symptoms of the disease, showing that the vaccination did not bring protection. Only two were left, which later proved to be immune to rinderpest.

The heart's blood of several cattle in various stages of the disease was injected into various small animals, but no disease was produced. In another experiment the heart's blood was cultured and inoculated into small animals, but no bipolar or other apparent organism was isolated. This blood was divided into two portions, one being passed through a Berkefeld filter (N). This material was injected into the jugular of a heifer; the other, unfiltered and apparently sterile blood, was injected

into the jugular of a yearling steer. No signs of illness occurred in the former, but the latter became ill on the third day and died on the eighth (subacute case) with typical lesions of rinderpest. A similar experiment was carried out in goats, with the same results. The goat inoculated with unfiltered blood died with typical symptoms of the disease on the fourteenth day.

A résumé of all the laboratory tests showed that:

1. The heart's blood of the sick animals never contained an organism which could be cultivated by usual means.

2. *Pasteurella bacilli* were frequently cultured from the spleen and liver of sick animals.

3. Direct microscopic examination of the blood was always negative. Direct microscopic examination of liver and spleen tissue showed Gram-negative bipolar bacilli.

4. Intravenous inoculation of a minute portion of the apparently sterile blood of the sick animals produced typical symptoms of the disease in cattle and goats, but no symptoms in rabbits, guinea-pigs or rats.

These laboratory tests, together with the typical symptoms and characteristic gross pathology, made us absolutely sure of our diagnosis of rinderpest. We ruled out hemorrhagic septicemia as the epizootic, despite positive cultures of *pasteurella* bacteria obtained from the liver and spleen of the sick animals, because these organisms were never found in the circulating blood. It is interesting to note in this connection that *pasteurella bacilli* were sometimes found as a secondary invader, but were not the cause of death in the animals.

The disease then became prevalent among the dairy herds about São Paulo and caused serious losses. One interesting observation was made in watching the progress of the disease through a dairy herd of 28 head, mostly Holsteins, including 1 bull, 15 cows, 5 heifers and 7 calves. On the twenty-third day following the death of the first case the last one died, showing a mortality of 100 per cent. They were housed in a barn and an adjoining shed, and had the run of a common barn lot. In order to note the natural progress of the disease no effort was made to isolate nor to contaminate. In other instances, among zebu cattle especially, a few had light attacks and recovered, showing that they were somewhat more resistant to the disease. The disease occurred normally only among cattle, but sheep, goats

and a deer sickened and died from natural infection when confined with sick animals. The period of incubation among cattle by contact was from 3 to 5 days, from inoculations 2 to 4 days, occasionally at longer intervals.

SYMPTOMS

It is well to state here that, as in many diseases, the symptoms and lesions are both subject to marked variation, and therefore some are present in some cases and modified or entirely absent in others.

The disease is largely characterized by an affection¹ of the mucous membrane, particularly of the alimentary tract. After the required period of incubation, the first abnormality to be noted was a rise of temperature, which gradually ascended, with slight irregularities, for a period of two to four days, and reached in some very acute cases 107.5, but more commonly registered between 105.5 and 106.5. The temperature then began to descend rather rapidly until it became subnormal, which required from one to three days, and the animal soon died. With the elevation of temperature there was likewise more or less acceleration of pulse and respiration. In some cases also the respirations were further modified by more or less dyspnea, especially in the latter stages, accompanied by grunting or groaning with each expiration. In many cases a slight cough was noted. In about one-half of the cases when a point near the acme of temperature was reached there was noted some lachrimation and some discharge from the nostrils. In a somewhat larger per cent of cases there was noted more or less salivation, but not so profuse as in foot-and-mouth disease. Examination of the mucous membrane of the eyes at this time would usually show marked redness and congestion of the conjunctiva. A similar condition of the mucous membrane of the nose also was sometimes noted. Likewise, at the same time, or slightly previous, the mucous membrane of the mouth assumed alterations. These alterations were quite variable. In many cases there developed on the lips, cheeks, palate and under surface of free end of tongue, small, usually scattered, but occasionally confluent patches, few or many. They appeared usually as finely granular, fibrinous, slightly elevated patches of a yellowish gray color, some of which became removed, leaving small

erosions, lacerations or ulcers. In other instances the entire mucous membrane of the mouth and tongue became covered or replaced with a soft, mushy, necrotic coating—a generalized stomatitis.

It was remarkable in many cases how much altered the mucous membrane became and yet the animal continued to eat. For a day or two before death, however, there was a complete loss of appetite and rumination. Often at this stage there was frequent gritting of the teeth. Throughout the course of the disease marked thirst was manifested.

Among the most characteristic symptoms was the diarrhea, which usually set in about the second or third day after the temperature began to rise. In nearly all cases this was the first sign of trouble noted by the owner or attendant, though in some cases death occurred without such manifestation. It began with a softening of the feces, which later became quite fluid and were often involuntarily ejected. The color was usually of a greenish yellow and in the majority of cases streaked with clots of blood. With this condition present the odor of the feces was usually very offensive. Examinations of mucous membrane of vulva often showed redness and at times a mucopurulent discharge.

As the disease progressed there was increasing dullness, manifested by lowered head, drooping ears, more or less closed eyes and prostrate condition. Shivering or trembling of muscular groups was often noted. In lactating animals there was a rapid decrease in milk secretion, and in subacute cases marked loss of flesh. The reason that some persons mistook the disease for blackleg was that there was a subcutaneous emphysematous swelling in a limited portion of the cases, occurring along the back at any point from the withers to the croup. This was undoubtedly due to rupture of emphysemic air vesicles of the lungs, as it was found only in cases where marked emphysema of the lungs occurred.

Many animals were autopsied with a fetus contained in the uterus, but very few abortions were seen or reported. The course of the disease varied from five to eight or nine days, but, as in many cases the disease was not suspected until diarrhea set in, death often occurred from three to four days after the first symptoms were noted by the owner.

LESIONS

Lesions, like symptoms, are subject to great variations, but, as would be expected in a typhus-like affection, the most characteristic lesions are to be found in the mucous membranes of the alimentary tract. The esophagus and first three compartments of the stomach rarely showed anything of significance, but the mucous membranes of the mouth, pharynx, fourth stomach, small and large intestines and rectum usually had well-marked alterations.

The lesions of the mouth have been described under symptoms. Some animals died, however, with very slight or no evident lesions of the mouth. In some cases the mucous membrane of lips showed only small, dirty, yellowish spots. The lesions of pharynx were less common than of the mouth, but when present were similar to those found in the mouth.

The mucous membrane of the fourth stomach showed the most constant and conspicuous alterations. These consisted in many cases of a very deep, diffuse reddening of the whole membrane, which was more or less tumefied. In other cases the deep congestion was limited to areas particularly about the pylorus. In other cases the injected areas were in the form of streaks half an inch wide by 2 to 6 inches long. The color in some cases was an ashen grey. In many cases the involved areas contained hemorrhages varying in size and were usually more or less scattered. Not infrequently erosions were observed, and at times distinct ulcers or necrotic centers.

The small intestines were likewise the seat of grave lesions. Here the whole intestine was sometimes involved, but more often it was confined to sections. Even the outside of intestines often showed a deep reddening with injection of the accompanying blood vessels. The mucous membrane within these areas also would be found deeply reddened, but hemorrhages and erosions were less frequently found than in the stomach and large intestines. Some tumefaction of the mucous membrane and of Peyer's patches were frequently observed. The mucous membrane of large intestines, particularly near the cecum and including it, showed areas of various sizes deeply reddened, within which were often observed scattered hemorrhages and at times caseous covered ulcers. The entire mucous membrane of the cecum was at times reddened. The rectum commonly showed a varying number of hemorrhagic spots or streaks only. The

mesenteric blood vessels were frequently engorged, and at times some subserous edema was present, but rarely were there any hemorrhagic spots on serous membrane. The great omentum, however, showed at times loose, scattered, reddened, fibrinous deposits on it. The mesenteric lymph glands were usually very succulent and at times slightly congested. The mucous membrane of the vulva and vagina were often deeply injected and at times presented hemorrhagic spots and erosions or necrotic ulcers. The urinary bladder invariably contained clear urine, the mucous membrane often showed petechial hemorrhages in limited number. The submucous blood vessels were sometimes visibly injected. The kidneys were commonly somewhat congested, the Malpighian bodies being visible as pin-point red specks. The bases of the papillæ of the medulla were likewise much reddened and congested, with light centers and apices.

The spleen seldom showed lesions, but at times was slightly enlarged and softened or showed a few hemorrhagic spots under the capsule. The liver was often more or less congested and friable. In a fairly large proportion of cases quite large hemorrhagic spots were visible under the capsule, which extended some distance into the liver structure. The gall bladder was invariably engorged with a limpid, dark, yellowish green bile. The mucous membrane was often studded with yellow granular appearing submucous areas, the size of pinheads. In only a few cases was there perceptible excess of peritoneal and pleural fluids.

The nutrient blood vessels of the heart were often deeply injected, and at times there were hemorrhages under the epicardium and more rarely under the endocardium. The heart muscle was usually more or less flabby. In many cases the lungs showed nothing or at most there was a hypostatic congestion. In perhaps 20 per cent of the cases, however, there was a slight or at times exceedingly well-marked interstitial emphysema. Occasionally there was observed some edema about the base of the heart and in the lungs.

As stated under symptoms, the conjunctiva was in nearly all cases deeply reddened in its entirety or limited to an area near the inner canthus on the lower eyelid. The mucous membrane of the nasal cavities was in many cases greatly inflamed, the surface often presenting an ashen gray color. The mucous mem-

branes of the larynx and trachea occasionally presented ecchymotic areas.

CONTROL

On or about April 1 the State Government of São Paulo and the Federal Government adopted measures for the control of the disease and its possible extermination from the country. As above stated, the disease was known to exist only within a radius of 50 miles, largely to the west of the city of São Paulo.

The plan of action decided upon in the beginning was to notify the officials of all the municipalities (counties) of the State of the existence of rinderpest, and to advise temporary restriction of the movement of all cattle, sheep, goats and swine until the limits of the infected zone could be determined. The zone having been determined, a rigid quarantine line was placed about it. A second quarantine line, some five miles outside the first, was then established, and the territory within was called the suspected zone. The Federal Government also prohibited all movement of cattle into or out of the State of São Paulo. With the restriction of the movement of cattle upon the highways the disease in the country district soon became self-limited, but near the city, where many dairy cows subsisted largely by grazing over unfenced grounds, it was necessary to employ rigorous measures to exterminate the disease.

The State Government offered an indemnity of 200 milreis (about \$50) a head for animals sacrificed, and 100 milreis for each animal which succumbed to the disease.

Inspectors made frequent visits to the different dairy herds, noting conditions and giving information as to modes of spread of the disease and taking temperatures. Upon positive evidence of first case in herd, the owner was advised to have all slaughtered at once. If he refused, his premises were placed in complete quarantine and he received only 100 milreis indemnity for each animal. Some inspectors insisted upon the killing also of buzzards, pigeons, chickens, dogs and cats. Nearly every one accepted the advice when given, and it was a sad sight to see the poor owners part with apparently healthy animals which had cost them four or five times as much as the indemnity *promised*.

It may be noted here that on autopsies of these sacrificed animals a large per cent were found to be tuberculous, but fortunately no one thinks of using unboiled milk in this country.

Within the quarantined area there were some 30,000 head of cattle, of which approximately 600 died of rinderpest and some 1,000 were sacrificed. All dead and sacrificed animals were buried deeply and covered with lime. The premises were then cleaned up, disinfected and whitewashed.

A limited amount of antirinderpest serum has been prepared by the writer and others to be used in case the disease should not be controlled by the quarantine and slaughter methods.

The last official report of a case of rinderpest was made on May 23, and it is hoped that the disease has been completely exterminated from the country. All restrictions on the transit of animals were removed by the Government on August 26, 1921.

ACCEPTABLE ROQUEFORT CHEESE MADE FROM COWS' MILK

Almost the entire world's supply of Roquefort cheese comes from Aveyron, a department or county in southern France. It is made principally of sheep's milk, and ripened in caves. The steady demand in this country for the green-mold varieties of cheese, especially Roquefort, has led specialists in the Department of Agriculture to experiment with the commercial manufacture of a domestic Roquefort cheese. As it would be impossible to obtain a sufficient supply of suitable sheeps' milk, cows' milk has been used. The chief effect is to give the cheese a slightly yellower color. The temperature, humidity, and peculiar ventilation of the Roquefort caves which are favorable to mold growth and proper ripening of the cheese, have been approximated at Grove City, Pa., in special curing rooms. Considerable cows' milk Roquefort cheese of good quality has been produced and marketed from this experimental plant.

The American milk cows which have been distributed through Bavaria are declared to be better milkers than the German breed. The Bavarian farmers expressed astonishment that the American cows give about 20 quarts of milk daily after their first calves, which is double the quantity of German cows.

—*Kansas City Star*.

NOTES ON THE CONTROL OF BOVINE TUBERCULOSIS

By J. TRAUM and S. LOCKETT¹

*Agricultural Experiment Station, University of California,
Berkeley, California*

IN THE CONTROL of bovine tuberculosis we should always bear in mind the self-evident fact that all our efforts should be directed toward providing for the uninfected cattle an environment free from tuberculous cattle and from materials made infective by the latter. Our procedures and recommendations in obtaining this end naturally differ to a varied extent, depending principally on the percentage and number of reacting animals in the herd and upon facilities and equipment at our disposal.

In February, 1921, we were called upon to recommend a mode of procedure in establishing a tuberculosis-free herd from one which proved to be (as shown below) badly infected with tuberculosis. The herd, as a whole, had never been previously tested. We applied the intradermal tuberculin test and made recommendations. The observations on time of appearance of the reaction and the recommendations are not new, but are given here to add to and emphasize those previously made.

I—TIME OF APPEARANCE OF LOCAL REACTION IN INTRADERMAL TUBERCULIN TEST

The question of the best time to make readings of the intradermal test has received much consideration at this Station and by others interested in the work. In a test performed on the badly tuberculous herd mentioned above the following observations were made bearing on this point:

In interpreting the results the standards contained in the report of the committee appointed by the Chairman of the Tuberculosis Conference² were adhered to, *i. e.*: Any circumscribed swelling the size of a pea (three-sixteenths of an inch in diameter) or larger, or a diffuse swelling, giving the inoculated fold a thickness of two or more times the thickness of the uninoculated fold, was considered a definite reactor. Any appreci-

¹ S. Lockett temporarily stationed in California; now with University of Nevada.

² Proceedings twenty-fourth annual meeting, U. S. Live Stock Sanitary Association, 1920, pp. 67, 68.

able thickening less than above was classified as indefinite or suspicious.

In all, 670 cattle were tested. For convenience of the reader they are grouped as follows:

Group I, 441 cattle (230 adults in lactation and 211 bred heifers) showed 299 reactors. Of these, 295 definite reactions were established during the first 96 hours; 4, not until the one hundred and twentieth hour observation. Of the 295 head, 8 were examined at the forty-eighth hour only. Of the other 287 reactors inspected at the forty-eighth and ninety-sixth hours, 113 were recorded negative at the forty-eighth, and 48 showed indefinite reactions at that period; thus at the forty-eighth hour 161 had not yet developed a decisive reaction. Five of these 287 reactors, showing a positive reaction at the forty-eighth hour, failed to show a decisive reaction at the ninety-sixth hour.

Group II—Eighty-five adult milking cows, with one exception, were examined at the end of the seventy-second hour and again at the ninety-sixth hour, and, as result, 58 definite reactors were found. Of the 58, 6 were indefinite at 72 hours and 2 at 96 hours. None of the 58 were altogether negative at either seventy-second or ninety-sixth hours.

Group III, consisting of 88 head (71 examined at the seventy-second and one hundred and twentieth hours, 17 at the seventy-second hour only), showed 67 reactors, all of which exhibited definite reactions at the seventy-second hour. One reaction receded from 3x at the seventy-second hour to $1\frac{1}{2}$ x at the one hundred and twentieth hour.

Group IV, 30 head of 5-months-old cattle, examined at forty-eighth and ninety-sixth hours, yielded 24 reactions, which were very pronounced at both 48 and 96 hours.

Group V.—A test performed on 26 milk-fed calves, 2 to 3 months of age, with readings at seventy-second and one hundred and twentieth hours, showed 5 reactors. At seventy-two hours all 5 were definite; at 120 hours 2 were still definite, 2 were indefinite and 1 was negative.

Two different batches of tuberculin were used in the above test. As a practical field check, tuberculin of the same serial numbers was later used in testing 645 cattle in four certified dairies. This test yielded 636 nonreactors, 7 reactors, 2 indefinite.

Dr. G. K. Cooke, of Berkeley, furnishes us the following information bearing on this phase of intradermal tuberculin test:

In May, 1921, he performed a test upon a herd of 331 adult cows never before tested. Readings were made at 60 and 96 hours respectively. (It was originally planned to make the second reading at the one hundred and twentieth hour.) Two hundred and thirty-seven animals were classed as reactors. Of this number, 58 were indefinite and 38 negative at the sixtieth hour observation. Eight animals, indefinite at the sixtieth hour, were definitely negative at the ninety-sixth hour, and 141 were positive at both sixtieth and ninety-sixth hour readings.

These observations emphasize what has been pointed out by this Station¹ and the California State Department of Agriculture, namely, that a large percentage of adult cows will fail to react at the forty-eighth hour, but may react later, and that some few do not react until the one hundred and twentieth hour. The percentage of late reactors is not constant; in some herds it is small, while in others it is considerable. In the young animals the reactions were all definite at the first reading.

The above and other findings further indicate that two readings should be made for the best results, the first between the forty-eighth and seventy-second hours and the second at the one hundred and twentieth hour. When one reading alone is possible, the results suggest that it be made either at the seventy-second or ninety-sixth hour. In official testing by the California State Department of Agriculture the ninety-sixth hour reading is preferred.

II—RECOMMENDATIONS

This Station^{2 3} has gone on record repeatedly as not being in favor of indiscriminate slaughter of reacting animals. Slaughter of reacting animals seems to be justified principally in herds, areas and States where the percentage of reactors is low and where the reacting animals can not be otherwise disposed of properly and safely.

The data given above show 70 per cent reactors, and we advised the Superintendent:

¹ Report of the College of Agriculture and Agricultural Experiment Station, University of California, year ending June 30, 1919, pp. 82, 83.

² Report of College of Agriculture and Agricultural Experiment Station, University of California, year ending June 30, 1920, p. 77.

³ C. M. Haring. Bovine Tuberculosis. Circular 155, Agricultural Experiment Station, University of California.

(a) The statistics of tuberculin tests indicate that no single method of test can be depended upon to discover more than about 90 per cent of the tuberculous animals in an extensively infected herd such as the one under consideration. Therefore it would be nearer an accurate statement of the tuberculosis condition in the entire herd (excluding the subsidiary test on the 26 milk-fed calves) to say that about 80 per cent of the herd is tuberculosis-infected.

The high percentage of reactors among the younger animals suggests very strongly the source of infection to be in the milk upon which they have been reared, as was suspected.

Although there is some variation in the percentage of reactors in the other groups, in no group is there a low percentage of reactors. Everything indicates a general and widespread infection of the entire herd. On the evidence of the test it is certain that the barns, corrals and fields grazed by such a herd must be grossly infected and therefore absolutely unsafe for healthy animals.

(b) We are of the opinion that the safest method of establishing a free herd from the cattle at present on the premises is to regard, for practical purposes, the whole herd as infected and begin with the newly-born calves.

(c) They should be removed, as soon as possible after being dropped, to an environment entirely free from any possible chance of contamination by the old herd.

(d) Such calves should not even be permitted to suck the colostrum, but instead should be given a 2 to 3 quart salt solution enema. They should be fed either milk heated to pasteurization or higher temperature, or milk from nurse cows that are without question free from tuberculosis (such cows can only be obtained from a 100 per cent clean herd).

(e) These calves should be tested at between 4 and 6 months of age and again tested before breeding. Any reactors or questionable animals should be, of course, eliminated from this herd and autopsies performed upon them.

(f) We consider it an almost impossible task to clean up the old herd by the Bang or any other system; and, whatever be done with the nonreactors, we insist that the calves that are reared under segregation as a nucleus for the new herd do not

in any way come in contact with any portion of the present herd at any time during its entire existence.

(g) In brief, it would be necessary to have a calf barn and pastures which would be entirely separate from the old herd and be cared for by individuals that have absolutely no association or dealings with the original herd. In view of the fact that the artificial rearing of calves is more or less of a difficult undertaking, we would strongly advise the choice of a site for locating the calf establishment to comprise good drainage, plenty of pasture, freedom and sunny exposure, with protection against wind and inclement weather. (This was very carefully done.)

(h) The carrying out of these recommendations would further entail the establishment of sanitary and easily cleaned maternity sheds and pens, with systematic attention to clean-up methods after the use of such cow compartments.

It is self-evident that, in order to carry out efficiently the above recommendations, it would be necessary to have an intelligent and reliable man detailed or charged with keeping tab on the dates that cows are due to calve. Cows should be put in these maternity corrals about a week before calving. As stated above, the calves should be removed as soon as possible after being dried (not licked and dried by the mother, but dried by an attendant) and promptly transported to the segregation location.

These, in substance, are the main features of making a start toward the establishment of a tuberculosis-free herd from the existing herd.

Dr. M. J. Harkins, who for a number of years was on the veterinary scientific staff of the H. K. Mulford Co., Glenolden, Pa., has resigned to accept charge of the breeding farms of Mr. Willis Sharpe Kilmer, with headquarters at Remlik Hall, Remlik, Va. Mr. Kilmer, though devoting himself primarily to the Thoroughbred horse, is very active in breeding Jersey and Aberdeen Angus cattle and Duroc-Jersey hogs.

Dr. L. A. White, who has been located at Turtle Creek, Wis., has moved to Parkersburg, Iowa, where he will continue the practice of his profession.

OBSCURE LESIONS IN TUBERCULOSIS¹

By C. C. CONLEY

U. S. Bureau of Animal Industry, Burlington, Vermont

THE subject of postmortem inspection of reactor cattle is of peculiar interest to a conference engaged in discussing progress in the control and eradication of tuberculosis. Without doubt it is seldom that veterinarians applying the various tuberculin tests do not anxiously await the abattoir report on findings, and it is but fair to say that the men assigned to postmortem inspection are fully aware of the cooperative part they are taking in this work when called upon to verify, if possible, through thorough inspection, the results obtained by men in the field. With this in mind, therefore, one can easily understand the seriousness with which the postmortem inspector approaches his work and how reluctantly he reports "no lesions" following a thorough examination of viscera and carcass.

In the routine work of inspection there arises at times evidence to prove that tuberculosis in its macroscopic appearance undergoes changes differing from the form usually presented to the inspector; in fact, there are many times when the aid of the laboratory is deemed advisable in reaching a diagnosis. I have in mind an animal which had reacted and upon postmortem showed in addition to the usual visceral lesions large and small tumors in all the muscles of the carcass. These tumors when incised revealed nothing characteristic of tuberculosis, yet upon laboratory examination were pronounced tuberculous growths. The parasitic invasion of lymph glands will sometimes cause a condition simulating tuberculosis, but the characteristics of tuberculosis being lacking, one can usually differentiate without fear of mistake.

In the examination of enlarged joints in cattle it appears that mistakes in diagnosing this condition as tuberculosis have been made, as material from joints clinically pronounced tuberculous have often been forwarded to the laboratory only to receive a negative report. Mind you, I do not say that tuberculous joints are not found; in fact, we have to report many of them; but

¹ Presented at the conference on tuberculosis eradication, Boston, Mass, June, 1921.

I wish to caution against a positive clinical diagnosis in these cases owing to the many conditions which cause lesions resembling tuberculosis, especially in the region of the femoro-tibial joint.

Inflammation of serous membranes will many times cause a condition resembling tuberculosis, while acute lesions of the proliferative type will, through error, be dismissed as of no consequence; hence the need of great care in considering these cases.

In the examination of reactors it is interesting to note the various locations of primary lesions. For example, a renal lymph gland, an iliac, a popliteal, an ischial, a precrural, pre-scapular hemo-lymph gland draining a hide lesion, the glands of the head and cervical region, the posterior mediastinal between the caudal lobes of lung, the inguinal glands of bulls and mammary lymph draining the udder with oftentimes evidence present in structure of udder; those mesenteric glands adjacent the ileocecal valve; also various bone structures, especially the dorsal region of the vertebral column. In the selection of specimen tissues for laboratory examination in those cases in which no visible lesions are it is well to include those glands of the mesenteric chain adjacent the ileocecal valve, regardless of whether suspicion is directed toward them, also any lymph glands showing enlargement and swelling with either unusual content of fluid or a hyperemic condition bordering on a plum red.

From laboratory data it is evident that with the aid of the microscope confirmation of reactions may be obtained in cases where macroscopic evidence was lacking.

A condition of fat necrosis is found in cavities of the body, also necrosis of the bones, both of which must be differentiated from tuberculosis. Another example is lime deposits in the region of the sternum and the ilium, which upon section reminds one of dried cream-colored paint.

Much can be written about the prevalence of hide lesions, though they appear to be restricted, geographically, to those States north of Virginia and are especially found in the States bordering the Canadian line. These lesions often present the characteristics of visceral lesions and are usually found at points where injuries have been received followed by manure infection, the fore and hind legs being favorable sites. On the hind legs the infection can often be traced to the small lymph nodes

leading to the popliteal gland and its course followed into the large lymph system, but in many cases hide lesions are restricted to the inner side of hide and fascia and appear not to involve the muscle proper, while in other cases the muscle is unmistakably infected, the evidence pointing to a strictly local lesion.

Attention is invited to the fact that not all lesions of the hide are verified by the laboratory as tuberculosis, there being a condition caused by pyemic infection which undergoes the same degenerative process, revealing upon incision inspissated pus and calcification. These various lesions of the hide bear such a striking resemblance that I consider it wise to make a conditional diagnosis and ask of the laboratory a confirmatory report.

The results attending the examination of reactors must be judged by the time the inspector can give to the work, and the importance attached to this work is evidenced by the unusual preparations being made to handle reactor cattle. Thus in many of the abattoirs of the country two or more men are assigned the task of further inspecting those cases which in the ordinary routine revealed no lesions. This supplementary inspection is many times rewarded through the finding of a lesion in some obscure part of the carcass, and proves an incentive for the inspector to bend every effort toward verifying the results obtained by the field men in the intensive campaign now being waged against bovine tuberculosis.

INCREASE IN TUBERCULOSIS-FREE HERDS

Latest report of the tuberculosis-eradication work by the United States Department of Agriculture shows that a total of 204,892 head of cattle in 8,839 herds have been accredited by the Government as free of tuberculosis infection, while 702,590 additional cattle in 56,113 herds have already been once tested and found free of the disease. On August 1, 1921, a total of 1,294,159 cattle in 79,341 herds were under supervision in the tuberculosis-eradication campaign. Furthermore, there were 218,531 cattle in 14,494 herds on the waiting list for testing. There is a constant increase in the number of animals and herds tested and accredited and in the demands on the part of herd owners who desire to place their cattle under Federal and State supervision.

THE VETERINARIAN AND PUREBRED LIVESTOCK

By GEORGE H. CARR

Brighton, Colorado

THE VALUE of purebred livestock has been attracting more and more attention during the past few years. Practitioners ten years ago considered it folly and a waste of time to advocate the raising of purebred livestock, but we are constantly being forced to meet new problems, among which are the limiting of the ranges and the displacement of horses with motor power. It is only a matter of time until the ranges will be divided up into comparatively small ranches, and the man who formerly owned thousands of inferior cattle or horses must raise smaller numbers and better quality. The tractor and the truck will continue to replace some of our horses, and we can see that the number of possible patients will not be as great as formerly.

This presents a problem to the practitioner which can be very satisfactorily met if his clients will breed better animals. When a stockman raises purebred animals the value of the possible patients is increased.

Under the present conditions it becomes necessary for the veterinarian to increase his scope of usefulness to the public. He must be as well informed as possible on all problems of the breeder and owner of livestock, including advice especially as to the best methods of breeding to pursue. The practitioner should be informed as to the possibilities in all popular breeds of livestock, then should carry on a live-wire campaign to establish as many herds of purebred animals as he can. This the veterinarian has an excellent opportunity of doing. No one has a better understanding of the value of a purebred sire in a grade herd than the practitioner, and he should be equally able to recognize the value of registered animals.

The veterinarian owes it to his clients to be able to advise them what blood lines are of the greatest value, and this can not be done unless he possesses a thorough knowledge of pedigrees. It is a common occurrence for the breeder to seek someone who knows pedigrees when contemplating the purchase of foundation breeding stock.

Many stockmen believe that one registered animal is the same as any other of the same breed. This is not the case. We have a client who owned what he was pleased to call "the best-bred bull in the State," and the price he paid would lend some support to the claim. An explanation of his pedigree to the owner convinced him that the individual was of very mediocre breeding. Upon our advice and with some constructive criticism he was persuaded to dispose of the bull and employed us to assist him in buying a high record bull to head his really good herd of registered cattle. That was a profitable and pleasant service and one that was much appreciated by the client. In cases like this the breeder does not want half-baked opinions, but wants to know scientific breeding facts, and it pays both client and veterinarian if this service is available.

Every pedigree is different and establishes to some extent the value of the animal. A well-intentioned breeder in our community has a cow which is his favorite because of the fact that the name Tilly Alcartra, the world's greatest long-time milk producer, is mentioned in her pedigree. We also have a client who has what he calls "the best-bred Percheron stallion in the State." Asked his reason for so thinking, he points with pride to the fact that the name of that great foundation horse, Brilliant, is mentioned among the ancestors of his horse. As a matter of fact it would be difficult to find a Percheron pedigree without the name of either Brilliant or Coco or both. These clients demonstrate the average understanding of pedigrees, and can be shown that the value of a pedigree on a purebred animal is in proportion to the proximity of well-known and high-producing ancestors.

The selection of foundation stock in any line is a very important step and one in which the breeder deserves and needs the advice of someone who is better informed than himself on the merits of the different breeds. It is at this time that the practitioner can exert his influence as an animal expert if he is qualified to do so; and to become qualified means that he must have given a good deal of time and thought to the study of purebred problems.

The breeder who is trying his hand for the first time raising registered stock should be advised not to buy a large herd to begin with, because he most certainly will not be able to buy a knowledge of scientific breeding with his herd. The prac-

itioner can see that the purebred business is one involving many risks, especially to a beginner who is short on capital and knowledge of breeding. Inasmuch as a loss to the client means a loss to the veterinarian, overstocking and injudicious buying should be carefully guarded against. These problems necessitate ability and diplomacy on the part of the practitioner and represent a distinct service to the client.

One of our most successful breeders started eight years ago with one registered cow and her calf. He has increased the number in his herd as knowledge of the business was gained, and today is one of our most substantial and enthusiastic advocates of purebreds. He buys nothing without first having it passed upon by his veterinarian, including a contract permitting a sixty-day retest.

There is no phase of veterinary practice in which the returns are gauged so closely by the quality of service given as by the purebred business. Knowing that his returns depend almost entirely upon the service given, the veterinarian should be a purebred expert. He must know the location of registry offices, the procedure of registration of animals and the cost of this service. This work is usually left to the county agent, but a veterinarian's clients should not be forced to underrate him as a livestock expert. It has been our pleasant duty to obtain registration papers on over 100 purebred horses and cattle during the past year and to be called upon to assist in a number of purebred sales. The breeder values and appreciates such service and is willing to pay the same fee or more for service of this nature than for an ordinary call. It certainly is a pleasure to make a call when the results of the service are known. There is no patient to be lost nor long-drawn-out course of treatment to be undertaken.

In our section we can be of most value along these lines by placing purebred sires in grade herds. The veterinarian who applies himself diligently to the matter can be the best informed man in his territory as to the location, ownership and breeding of desirable sires and the price asked. If conscientious in the matter and reputed as knowing purebreds and pedigrees, his recommendations to the prospective buyer carry great weight.

Our greatest help and best friend in placing purebred livestock, especially purebred sires, among our clients is the county

agent. Here let me deviate long enough to say that our county agent is performing a very valuable service along these lines. He appreciates cooperation and advice and is ready at any time to make a trip to the farm of an interested client to urge him to purchase a registered sire or other purebred livestock. I believe that this demonstrates, in a way, that the county agent is an asset to any agricultural community, and that the practitioner has been a little hasty in always assuming that the county agent is his enemy. The county agent has come to stay; his services are of value, and he functions much better as an interested friend than as an antagonist.

It has been our pleasure and privilege to assist at various farm bureau and livestock meetings in advocating the improvement of breeding methods, and I believe that at no time has the stockman been more eager and willing to accept proven methods than at present. This type of service is somewhat unusual for a practitioner, but it certainly is ethical and of value to all concerned.

Along this line the veterinarian can perform a distinct service to his community by assisting in the organization of purebred clubs, especially calf and pig clubs for the boys and girls. Enthusiasm for purebred cows is rivaled only by that shown for purebred pigs by the members of our boys' and girls' clubs. We can already see that the boy or girl with one registered calf or pig today will be the purebred breeder and good client of tomorrow. They take a keen interest in the particular breed of which they own one individual, and naturally they have many questions regarding type, feeding, care and management which the practitioner can be easily in a position to answer. These boys and girls are starting with only one or two individuals and are increasing the number as knowledge of their problems are gained; therefore we expect them to become the future well-informed, scientific purebred owners and clients. With their questions they are willing to go to the practitioner if they feel that he is vitally interested in their future success and able to give them sound advice.

Another method of stimulating the purebred business and eventually the practitioner's business is the showing of worthy animals at the various fairs. There is no greater incentive toward the desire for better animals than competitive showing at these fairs. The pride that comes from the ownership of a

winning animal is infectious and spreads in a community. Most owners of one or two purebred animals hesitate to show them because they are not familiar with methods of conditioning for show purposes and rules of entry. Going from one farm to another, and knowing the desired types, the veterinarian can greatly increase the number of animals shown by constantly advocating better breeding methods and informing the client how best to fit his animals, and by selecting worthy livestock to be shown. This service does not make a direct daily return to the veterinarian, but it certainly builds a good foundation for satisfactory future business. We have, as a class, been expecting too great immediate returns and have just begun to realize that upon the welfare of the livestock owner depends the future of our profession.

Too many of our purebred owners are committing the error of registering every purebred animal regardless of conformation to type or suitability as a breeding individual. This is a poor business policy and one which in a short time will cost the purebred livestock breeder more than he can possibly realize on the sale of such animals, for nothing so reacts upon a breeder as the sale of an unworthy individual. The veterinarian can do a great deal toward eliminating undesirable breeding animals. Castration of scrub purebreds should be just as closely practiced as the castration of grade animals, and the practitioner need not hesitate in recommending such measures. He will be doing the individual owner and the purebred industry a favor by seeing to it that there is only a survival of the fittest.

These are some of the ways in which the veterinarian can be of greater service to his clients, especially to those who own registered stock. It is a source of great satisfaction to have a good percentage of clients who are owners of purebred animals. Veterinary service is much more promptly and intelligently used. On purebred patients we do not experience so great a difficulty in obtaining some consideration and care as we do in grade animals. The owner of a fifty-dollar animal hesitates a long time before calling the veterinarian, while the man whose three-hundred-dollar registered animal is sick usually seeks the best veterinary service available, and at once.

This has quite a tendency toward making better veterinarians by eliminating those who do not keep abreast of the times and consequently can not give high-class service on valuable ani-

mals. The time of the "old farmer" has passed, and in his stead we have the agricultural business man who knows, appreciates and is willing to pay for good service.

There is certainly a greater stimulus toward the making of better veterinarians by linking the interests of the practitioner with the interests of the owner of purebred livestock. The veterinary profession is a young profession and has progressed only so fast as the value of animals has increased. Therefore let us have a concerted effort on the part of the veterinarians to place more and better purebred livestock on our farms.

DISCUSSION

DR. O. E. TROY (Raton, N. Mex.): I wish to second Dr. Carr's sentiment regarding cooperation with the county agent. My experience has not always been the best with the county agent. I think we should solicit their cooperation and cooperate with them, instead of working in the opposite method.

DR. KINSLEY: The Doctor should be complimented on presenting such a paper as this to a group of practitioners. The practitioner can not afford to overlook the advantages of the purebred animal. Those men that are in the communities in which the purebred animals predominate we find are the thrifty veterinarians of today. The veterinarian, the practitioner, is dependent upon the livestock industry. The livestock industry, however, is the basic principle in itself. Your function is to further the benefits of the industry, and you can do this better in a community in which the animals are purebred. They are much more valuable to the owner. They are much more serviceable to our community, to our State, and to our country, than are the scrubs. Nearly all the veterinarians are advocating purebred animals, but I fear a great many of the practitioners are not making careful study of the advantages and the individuals of the breeds. I fear that is one of the weak points, particularly of our older practitioners. The younger men have had the privilege that the older men did not have in college of obtaining courses in this subject. I should like to see a lively discussion on this topic.

DR. JAFFRAY: I want to draw attention to one little point the Doctor brought out there, about the pedigree of an animal. I was called down here a little while ago by an attorney in Chicago who was sued for \$10,000 for a valuable sire which was supposed to be one of the finest around that point, and he wanted to know where he could get judges as to the value of that animal. It appears he had a copy of his pedigree, and he claimed he paid \$10,000 for him. I said, "Have they backed that up with anything?" He said, "What do you mean?" I said, "What has this sire done? What can he show?" He said, "That is a good idea." They defeated the law suit with that one point. They couldn't show that that sire had followed up with the ancestors. There was just one law suit of \$10,000 decided because they couldn't back up what the animal did.

CHAIRMAN FERGUSON: There are a lot of good points in this paper. I am interested in that particular point that the Doctor just mentioned. I think that it is just as important to eliminate purebred scrub as it is the grade and the scrub. There are plenty of purebred scrubs, and the purebred industry has been handicapped largely by dealers. The purebred man has let the dealer run his business to a great extent, and it has hurt him. The time has come right now when that part of it must be eliminated.

DISCUSSION OF PAPER ON PARTURIENT PARESIS¹

DR. C. C. STEWART (Colorado Springs): I didn't get to hear the first part of this paper, but I noticed an article in *THE JOURNAL* some months ago, by one of the members, who seemed to consider that he had a very unusual case, it having occurred seven days after parturition, and I suppose it has been the experience of most of the men that it might occur then or later. I have had particular cases occur four weeks, and one six weeks after parturition, and if there is anybody who hasn't experienced that, it might be well to keep it in mind, because I found that it will occur that long after parturition. From the article in *THE JOURNAL* it seems as though that particular writer was very much surprised and doubted his diagnosis somewhat for a time because it occurred seven days after calving. I don't know what the general experience has been, but I had a case several weeks ago, in a Jersey cow, four weeks to the day after calving, and it was a typical case in every way and responded to the treatment.

DR. G. H. HUTHMAN (Portland, Oregon): We find that camphor and oil is better than strychnin. We use 30 c.c.

DR. J. B. PATERSON: In the line of treatment that this gentleman has used, it seems as though he advised not earlier than four hours. In a number of cases that I have had there have been return attacks after six hours, and in one case especially a calf had been allowed to suck early in the evening and the cow was decumbent. In two or three hours we had her on her feet, but some time in the night the calf got with the cow again, and the next morning she was down. During the day we got her up and in twelve hours she gave a gallon of milk. We had another case where the cow was milked regularly, and every few hours she was inflated.

CHAIRMAN FERGUSON: That is a good point to bring out—that relieving of the udder after the treatment is applied in relapsed cases is good. That very frequently happens, and the way I handle them in practice is to repeat the gauze. We don't ligate the teats. We take a little rubber band and tie it over the teat, with instructions to the owner to remove it a little later. As a common procedure we don't ligate the teat, but do make a return call on valuable cows, and in those cases have the owner milk them out, and inflate the second time, and feed the milk to the calf if it is thought advisable to feed him. It isn't a good plan to feed the calf too early, and it is better to remove the calf from the cow's stall to another stall so he can't interfere with her udder at all. That is a good point to bring out, because the cow might be reported as up, and the milking of this animal might be recommended, and the owner might lose her. A man with experience wouldn't recommend this, but a young practitioner might. He might forget to have the calf removed, and the calf might remove the milk in the night, and it might cause the loss of the cow.

DR. G. H. CARR (Brighton, Colorado): I have had during the last month two cases in which the patient was extremely susceptible to strychnin. It was strychnin poisoning and it was quite alarming. Is there anything that you would give in those cases to allay those symptoms? I have had one death in the last three years from strychnin poisoning.

SECRETARY MULDOON: I think there were a few things which the

¹ This discussion followed the reading of the paper on "Parturient Paresis," by A. A. Motley, Alpena, Mich., at the fifty-eighth annual meeting of the American Veterinary Medical Association, Denver, Colo., September 5-9, 1921. Dr. Motley's paper appeared in *THE JOURNAL* for October, 1921, vol. 12 (n. s.), p. 63.

essayist did not bring out; that is, the fact of the temperature. He says it may sometimes be 103. We should not forget that the temperature oftentimes in the beginning of these cases goes to 105 or 106. There is a sharp curve, and then it drops down to subnormal. Then we must not forget that the animal sometimes shows nervous symptoms in the beginning of parturient paresis. We should keep those in mind.

One or two doctors have brought out the matter of strychnin poisoning. Personally, I don't use strychnin. I use cocaine, if I use anything at all, as a stimulant. I like cocaine for things of that nature, and I use cocaine in place of strychnin. In cases of this kind I use 2 to 3 grains. Sometimes I use more than that if I think it is necessary. I like cocaine better than I do strychnin in a case of this kind. Camphorated oil I am not particularly fond of. You are likely to get abscess formation and other things, if you have a dirty syringe. The fact is, you are likely to get abscess formation with camphorated oil, no matter how sterile you feel the injection is.

DR. HUTHMAN: We have tried camphorated oil two years and a half, in every case of milk fever, and we have still the first case of abscess to find, and we disinfect with iodine and lysol, and so on. So far we have had no abscess formation, where we use it subcutaneously. We don't use it intramuscularly. We find we get much better results, and it is perfectly safe. Even as little as a quarter grain of strychnin has had a bad effect on animals, producing toxic effects. In a high-grade Jersey cow we had toxic symptoms from strychnin.

CHAIRMAN FERGUSON: That is very true. I believe it is the experience of all practitioners that the cow is very susceptible at that time to the action of strychnin. If it is used, a small dose is indicated, and I agree with you in that camphorated oil a good many times does not cause the formation of abscess, although, as Dr. Muldoon has said, I have seen a lot of trouble from camphorated oil, for some reason or other; it may be the mixture or preparation or something of that kind. We have been mixing our own and use cottonseed oil and ether, and we have no trouble. We inject that intramuscularly. We don't take any pains in sterilizing the skin. We select some point of skin to go through that is clean. We take a little pledget of cotton and wipe it off with iodine a little while before making the injection, and, of course, a clean syringe is used. The syringe is not boiled every day if we are not using it for something that might contaminate it.

DR. HUTHMAN: It may be that many use just common camphorated oil, and that may be where they get abscess formation. I have noticed the difference in camphorated oil and camphor and oil. We have had abscess from straight camphorated oil. We get the 30 c.c. ampule, which costs something like 20 cents. We charge that to the owner of the animal. We make a minimum charge of so much for the trip and so much for medicine and a general charge for injection of camphor and oil, 50 cents.

DR. STEWART: I have found that camphor and oil is all right if it is warmed to the temperature of the body. I have had abscess where I used it cold. The oil will naturally retain the cold temperature longer than when we make the solution warm. I have used caffeine, sodium, and so on, when the patient was very nervous.

CHAIRMAN FERGUSON: This question of abscess formation after the injection of the agent into a cow is an important one. If we are dealing with high-class cows, we must keep away from abscess as far as possible. It is well to know how to handle camphorated oil, where it is indicated. There is a time when the camphorated oil you buy

is made with neutral oil. Some claim that that isn't so good. I never used any myself. These are all excellent points.

DR. PATERSON: I have had a number of cases of parturient paresis where there was a light-headedness and the cows were weak on their feet and wobbly, and would fall around, and not seem to know anything. In those cases I was just wondering whether I was treating the right disease or symptoms.

CHAIRMAN FERGUSON: I believe you were. That is one of the symptoms. You may be called on to see a cow and she may be a little wobbly on her feet and nervous. If you get a treatment in, it will very often prevent her going down. Quite often it will keep her on her feet. Those cases that come six or eight days after parturition respond to the treatment. Anything you get right near parturition time is right sure to be parturient paresis. Of course you may get toxemia then. Those cases that come some time afterwards are mammary toxemia or toxemia from other causes. In those cases of mammary toxemia you will get good results from the air treatment, and you will find in most of those cases that if it isn't present, if there is not noticeable symptom of it present at the time, a day or so later you will find you have had an insignificant mastitis, but enough to cause toxemia.

DR. HUTHMAN: I want to ask a question that has been called to my attention, about the farmers' own treatment of a case, pumping it up. I have gone on two cases recently where the whole body surface seemed to be inflated with air, and I was wondering if there was any way by the use of the bicycle pump that they tore the skin loose from the udder tissues. Where that took place, my treatment has been the use of camphorated oil and hot applications to the back, and continually massaging the body. In two out of three I got results. One died with pneumonia. I think the bicycle pump gives too much force. Instead of inflating the milk tissue, it tears the skin loose and inflates the tissue all over the body.

DR. D. S. JAFFRAY, JR. (Chicago): Around Chicago we have the box-stall cow, the cow that doesn't get any exercise. We use the treatment a good deal, and we have cases of toxemia just as often as parturient apoplexy. I don't agree with the Doctor in massaging the cow where the air has gone through her body. I think it well to leave that alone. I have had cases where I was called in afterwards, where the air had gone all through the muscles of the back. I never touch that. I use hot applications to the udder. Once I found an infection after the air treatment where a bicycle pump had been used. They had used no precaution to sterilize the pump, and there was infection due to the dirt in the hose. I think there is one point that should be looked into.

DR. GRIZZELL (Kansas): Before entering college I was acting as herdsman for a large dairy firm in the East, and when I first came there we had a number of cases of parturient paresis. We made it a rule there never to milk the cow thoroughly for a week after calving, and we diminished these cases materially. I wondered since whether that did good or not. I have advised a few men to do that and they have. By leaving a portion of the milk in for a week or ten days, it doesn't seem to hurt the udder any and does hold the animal back from being attacked with this disease. I want to take exception to one thing in the paper of Dr. Motley, and that is, that I have treated two cows three years successively, with the history that they were treated one year previous to that, making four years. I would like to know whether anybody has anything to say about leaving some milk in the udder.

DR. HUTHMAN: My experience has been the same. We milk about half of the milk three times a day, instead of all the milk twice a day.

In cases that I have had two years in succession I tried it the third year and had no success. We also give a good dose of physic immediately after calving, say twelve or fourteen hours after calving.

CHAIRMAN FERGUSON: What do you do with a case that you find stretched on the side, almost all in, and bloated? You have to relieve the bloat right away or it will be a case of asphyxiation. Then there is another class of cases, the kind that come down with it before the act of parturition has taken place, or during parturition. There are two good points to bring out.

DR. STEWART: I have found those cases, and the first thing I do is to get the animal on the other side, and before I get it on the sternum I use a little spirits of ammonia on a piece of cotton and hold that in the nostrils. I let them inhale some of the air that is more or less charged with ammonia. It seems to relieve them quicker than anything in the way of hypodermics or anything I have tried.

CHAIRMAN FERGUSON: What do you do with those cases that haven't calved yet, coming during parturition or a little before? How do you handle those?

A MEMBER: How do you handle them?

CHAIRMAN FERGUSON: The way I handle them is this: I give them the treatment before I try to deliver the calf. I give them the air treatment immediately. I get them into the proper position and then go on and deliver the calf. I prefer doing that way rather than to try to deliver the calf first. You have a very inert uterus and air treatment seems to invigorate it, and by giving a treatment and possibly leaving them an hour or so, the parturition is made easier and much safer for the cow.

DR. H. E. KINGMAN (Colorado): Do you find the cervix dilated?

CHAIRMAN FERGUSON: Yes; it is dilated, but inert. There is a lazy uterus. It doesn't affect the uterus, because that is demonstrated many times in the retention of the placenta. The placenta is already in shape to come, but there isn't any vigor, and involution doesn't take place or doesn't start, and the placenta just remains lightly attached. If the cow receives treatment, in a few hours it usually passes away itself. If you apply the treatment before assisting the cow to deliver the calf, you will find it invigorates them. If you go to work on the cow before applying the treatment, you will have trouble.

As to those cases of bloat I might say a word. I am referring to the case that is bloated to such an extent that the animal is almost asphyxiated. Of course we all know about tapping, and tapping will relieve them. If the cow hasn't gone too far, roll her up on her sternum, and she will belch up, but it isn't safe. The nicest way to do is not to disturb the cow at all, but take the stiff stomach tube and guide it down over the epiglottis into the esophagus into the rumen, blow out the clog and let the gas off. A stiff tube will follow down into the rumen and get the gas that is disturbing the animal. It is nearly always dry gas, and it will relieve it in an instant. The bloat will be relieved. Then give the treatment. It is safe to leave the cow on her side until you treat the udder. Roll her on her sternum and you have a good, safe prospect for recovery.

The object in having this paper was to bring out a discussion that would better the treatment, and guard against being a little bit careless in applying one of the best treatments that we have ever had for any disease, the oxygen or Schmidt air treatment. The men in the profession belittle that treatment to the extent that they are a little careless with their equipment. They have a dirty old bicycle pump along, or an outfit that is ridiculous for them to use, and they attempt to make an impression with that. If they will get some sort of equipment that is out of the ordinary, like a water bottle with two tubes in it, and a nice bulb and a nice clean needle,

you can make an impression on the owner that way. His herdsman may be using a dirty old outfit. He wants you to do the work. If you do it in a way that will attract his attention, it will mean a great deal.

As to the hypodermic medication of animals with this disease, of course we all use it, and it is almost always indicated, and we know why. We are going to continue to use it. The impression that your treatment leaves goes a long way toward keeping up this good treatment that this man Schmidt has given us. He is about the only practitioner that gave the profession something that is big. This is big, when you stop to think of the number of valuable cattle that used to die in the earlier days with parturient paresis. You must appreciate that this is a wonderful treatment, and Schmidt is the man that is responsible for it. He started in with the iodid potassium solution first, and then worked up to the air method. If we guard it carefully we will have a fine treatment and we can keep it right in the profession. If we have our outfits in proper shape to make an impression, that is all that is necessary.

Dr. Chauncey E. Sawyer, of Carlyle, Kans., has been appointed as instructor in pathology at the Veterinary Division of the Kansas State Agricultural College.

The veterinary extension work of the university of Pennsylvania has been placed under the general supervision of Dr. George A. Dick, Professor of Animal Industry in the Veterinary School. Dr. Dick will have charge of correspondence and other administrative work and the other members of the veterinary faculty will assist him in giving addresses at meetings and in the other instructional work.

Dr. Dick will continue his regular classes in animal industry in the Veterinary School.

Dr. B. L. Dawson and Dr. F. J. Lingo, of the Federal tuberculosis eradication forces in Florida and Ohio, respectively, have been transferred to similar work in New Mexico.

Dr. Clement E. Wilmot, formerly engaged in Government work for hog cholera control in Iowa, has been assigned to tuberculosis eradication in Missouri.

Dr. Paul Vaughn has been placed in charge of the Federal tuberculosis eradication work in North Carolina with headquarters at Raleigh.

CLINICAL AND CASE REPORTS

(Practitioners and others are invited to contribute to this department reports of unusual and interesting cases which may be helpful to others in the profession.)

INDURATED UDDERS IN VIRGIN HEIFERS

By E. M. NIGHBERT

United States Veterinary Inspector, London, England

IN facilitating exportation of purebred cattle from Great Britain into the United States, on a recent visit to Scotland my attention was called to a disease affecting the udders of young heifers prior to breeding them. The condition was commonly referred to by breeders as "udder clap." I was informed by breeders that treatment was unsuccessful and that affected animals were consigned for slaughter.

History.—The disease was reported to be quite common, developing during dry and unusually warm summers, when cattle would bunch in the pastures and seek shade. It appears from the information gained that not more than one to four animals would be attacked during a season on the same farm. The disease always appeared in young unbred heifers or well-developed heifer calves. Also the disease developed so slowly that it often escaped notice until the animal began to lose flesh or failed to keep in good condition under the customary care that the herd was receiving. The disease was reported to have been seen in unbred ewes.

Symptoms.—The first symptoms noticed were that one and sometimes two teats would be prominently enlarged and hard to the touch, with acute local inflammation of one and sometimes two quarters of the udder. The disease would slowly progress until the affected parts would become greatly enlarged, giving the appearance of a developed udder in advanced pregnancy in an adult cow. The affected parts would be extremely hard to the touch, generally painless on palpation, except when abscess formation appeared superficially. The general appearance of the animal would show slight unthriftiness, appetite remaining good but development retarded. These are the symptoms described by the owner.

I asked if I might be shown a case, and was promptly taken

to a local slaughtering establishment where two heifers between eighteen months and two years of age had been sent for slaughter. One of the animals was affected with the udder trouble and I had an opportunity to make a postmortem.

Postmortem appearance.—The carcass appeared normal and fairly fleshed. No enlargement or abnormal appearance of the body lymph glands. Abdominal and thoracic viscera normal, with no involvement of lymph glands. The udder was the only organ showing disease. One teat and quarter were involved, being greatly enlarged, reaching the dimensions of approximately 6 by 14 inches. On palpation the teat and quarter showed extreme induration. In cutting through the quarter a hard fibrous mass was displayed, with pus pockets intermixed, filled with a greenish-hued fetid pus. The cut surface was smooth to the touch, and the parts affected displayed a progressive and prolonged interstitial inflammation.

Differentiation.—The macroscopic pathological appearance showed no calcified deposits nor enlarged lymph glands as are seen in tuberculosis. The pus was thin, greenish-hued and fetid, which would exclude actinomycosis. There was no appearance of local injury or point of infection. Therefore the condition indicated chronic garget commonly seen in aged dairy cows at the time of slaughter.

In my experience in practice, in the field and in postmortem work in connection with United States meat inspection, this condition in young heifers was not observed in the United States.

BREED AND SEX SUSCEPTIBILITY OF CALVES TO BLACKLEG

By J. W. LUMB

Sioux City, Iowa

THE QUESTION has often been raised as to what breed and sex of calves is the most susceptible to blackleg infection. Some contend that the beef breeds are more susceptible than the dairy or dual-purpose breeds. Others hold that the reverse is true. The data regarding sex and breed susceptibility appearing to be so exceedingly meager, it was thought that a short compilation of that kind might be of interest to the profession.

The calves from which these data were compiled were bought on the open market in mixed lots without reference to breed or sex, keeping, however, within a certain weight and age limit. They were inoculated with a standard dose of pure virus for the routine production of blackleg aggressin. Each calf received practically the same dose of virus, administered in the same way. This virus had been previously standardized so that variations in the virulence of the virus would be practically negligible. Almost every lot of calves presented for inoculation at any one time was made up of both males and females, as well as being of a mixture of breeds, all of which tends toward a uniformity of results in eliminating unequal variations. The calves were all grade calves. Any that did not show a distinct breed type were put in the no-type column.

Table 1.—Classification by Breed

Breed	1918		1919		1920		Total Inoculated	Total Im-mune	Per cent Im-mune
	Inoculated	Im-mune	Inoculated	Im-mune	Inoculated	Im-mune			
Aberdeen-Angus.....	36	6	32	5	29	8	97	19	19
Hereford.....	50	8	130	17	172	30	352	55	15
Holstein.....	77	9	123	21	84	22	284	52	18
Jersey.....	30	4	42	9	19	2	91	15	16
Red Polled.....	18	2	71	11	66	8	155	21	13
Shorthorn.....	354	54	491	92	488	103	1,333	249	18
No Type.....	71	13	112	24	119	18	302	55	18

It will be seen from Table 1 that the breed susceptibility varies but slightly, the limits of the immunes in all the breeds falling between thirteen and nineteen per cent. Three of the seven classes each showed 18 per cent of immunes. Figuring the percentages by years for the Shorthorns we get 15 per cent, 18 per cent and 21 per cent. This leads to the conclusion that the great number of Shorthorns used gives us a more reliable percentage of immunity than we get from the small lots used of Aberdeen-Angus (19 per cent) and Red Polled (13 per cent). Had there been as many animals inoculated of these breeds as of Shorthorns the per cent of immunes might have been brought to approximately the same level.

The conclusion, then, would be that the breed has very little if anything to do with the susceptibility of the individual animal.

Table 2.—Classification by Sex

Class	1918		1919		1920		Total Inoculated	Total Im-mune	Per cent Im-mune
	Inoculated	Im-mune	Inoculated	Im-mune	Inoculated	Im-mune			
Heifers.....	265	53	416	79	425	100	1,106	232	21
Bulls.....	180	23	239	28	207	18	626	69	11
Steers.....	236	20	367	54	310	55	913	129	14

In figuring the yearly percentages of immunes of the three types inoculated, in Table 2, we find that the heifers in all three years, using a large number of animals, showed a persistently high per cent of immunity as compared with either the bulls or the steers. There is not a great difference between the number of heifers and of steers inoculated. While the number of bulls is only a little more than half that of the heifers, it would seem as if enough animals were used to form a representative group. It will be seen that a total of the males gives an 8 per cent lower average immunity than for the females.

The conclusion would be that heifers are, when inoculated, more highly resistant to blackleg than the males.

TRAUMATIC PERICARDITIS

By B. J. FINKELSTEIN

Cherry Valley, N. Y.

I REPORT the following case as being both interesting and somewhat unusual:

Holstein cow, five years old. Saw her first on August 8. No history other than that she had dropped off in her milk, and refused to eat. Examination showed the following: Temperature, 102.3; pulse, 118; respiration, 24. Cow was recumbent, but would get up without much urging. On auscultation over the heart region I could determine a splashing sound. Rumination had not stopped, according to the owner. I could not detect any rumen contractions. On percussion over the region where reticulum lies cow showed marked pain.

I diagnosed the case as traumatic gastritis and administered a saline purgative. Told the owner the cow would die and I should like to "post" her after she had gone to bovine heaven.

I heard nothing of this case until August 24. Then the owner called on me and informed me that the cow was still alive but very weak. He agreed to butcher her so that I might perform a postmortem.

When I saw her again I found on examination that the pulse was very weak and frequent (I could not count the number of beats per minute). The brisket and submaxillary space were both markedly edematous. However, the feces looked normal.

Postmortem showed the following: Liver enlarged to twice its normal size, was friable, and the capsule peeled easily. Lungs both congested throughout. Heart was about five times normal size, and the muscular walls were taut against the pericardial sac. On opening the reticulum a thin, evil-smelling pus slowly oozed away. I followed the course of the abscess and found a piece of wire about three inches long on the pleural side of the diaphragm. Here the abscess was just about the diameter of the wire. The pericardial sac was punctured and there was a small hole in the right ventricle. On opening the right ventricle about four quarts of the same thin, evil-smelling pus was released. The endocardium was thickened and rough. The valves leading from the right auricle were hard and greatly enlarged. The right auricle, although somewhat enlarged, appeared quite normal. The left side of the heart showed no very marked changes other than that the muscle was somewhat thinner than usual.

I have wondered since why this cow did not die of acute septicemia. The heart weighed $14\frac{1}{2}$ pounds with its pus contents.

DYEING DOGS IN PARIS

Reports from Paris indicate that many women are having their pet dogs dyed a tint to match the gowns they wear.

The blonde, henna, rust and brown shades are easily accomplished as coats of both Chows and Pekingese responded well to the usual peroxide and henna treatments, but some difficulty has been experienced in securing matching lavender dachshunds and purple Pomeranians.

The fashion has been further complicated by disinclination to use German dyes on French dogs.

ABSTRACTS

MEASURES TAKEN IN SWITZERLAND AGAINST FOOT-AND-MOUTH DISEASE IN RECENT YEARS. L. Panisset. *Rev. Gén. Méd. Vét.*, Jan. 15, 1921, pp. 1-12. (Abs. in *Bul. Inst. Pasteur*, vol. 19, p. 536.)

These measures are grouped under three main headings: General slaughter, sanitary measures, and treatment with blood of recovered animals.

Slaughter is a good measure at the beginning of an epizootic, when there are but few centers of infection. It may also be useful at the end of an epizootic, in freeing the country of isolated centers. But when the disease is widespread this measure becomes useless.

Sanitary measures, although well applied in Switzerland, have proved efficacious only in the first centers quarantined. When the centers become numerous all sanitary barriers are powerless to prevent the extension of the disease.

It is rather difficult to determine the value of treatment with the blood of recovered animals. This treatment is not preventive. It seems capable only of diminishing the gravity of the natural development of the disease.

THE TONSILS AS A PORT OF ENTRY FOR INFECTIONS. Julius Citrona. *Deut. Tier. Woch.*, 1920, no. 27, p. 240.

The physiological function of the tonsils has not been fully explained. Their functions may be excretory, as well as being the point of entry for infections and at the same time they may be apparently normal.

In producing experimental paratyphus the normal lymphatic esophageal ring has been found to be the point of entry for infections per os. It is therefore probable that in this manner natural infection with typhoid and paratyphoid takes place. Infection of the tonsils is not proof of their being a port of entry for infecting material. This is only probable, as tonsillar affections precede general infections. Tonsillar relapses lead to chronic tonsillar diseases. Injuries to the tonsils give rise to fresh attacks and only tonsillectomy favors

recovery. The connection between relapsing chronic superficial tonsillitis, polyarthrititis rheumatica, glomerular nephritis, acute endocarditis, pleuritis, and cryptogenic sepsis is simply the result of tonsillar infections. J. P. O'LEARY.

THE PREPARATION OF POLAR STAINS IN VARIOUS BACTERIA. E. Epstein. Arch. fur Hygiene, vol. 90 (1921), pp. 136-154.

Polar staining is not characteristic of any particular species of bacteria. It may be induced quite generally in bacilli, and hence has no differential diagnostic value. The usual heat fixation with the flame injures or destroys polar staining. Alcohol fixation conserves it. Polar staining following alcohol fixation is not an artifact; a true morphological picture is obtained. Organisms must be cultivated in fluid media to show the polar staining; when grown on solid media only few species show it. Polar staining seems to be related to the vital processes connected with growth and fission of the organisms, and is caused by the intake of water. W. N. BERG.

CONCERNING OTITIS EXTERNA PARASITICA OF THE CAT. D. Bruderlein. Deut. Tier. Woch., 1920, no. 27, p. 231.

The treatment of a malady produced by the acarus, *Dermatophagus auricularis felis*, is accomplished by a thorough cleansing of the external auditory canal. The agent best suited for this purpose is liquid paraffin. As specific remedies the following are recommended: 3 per cent creolin, balsam of Peru, styrax liniment, or 5 per cent oil of caraway. These remedies are applied at 2 to 3 day intervals. They possess excellent parasitocidal properties, are non-irritating, are readily miscible with oils or fluid fats, and in addition are easily preserved. The animal's bed should be treated with 2 per cent formalin solution or creolin water. The author has found that when fresh mites are placed in liquid paraffin they die on the fifth day. From this he concludes that the general opinion which exists broadcast that the mite is destroyed in a relatively short time as a result of suffocation is not substantiated.

J. P. O'LEARY.

ETIOLOGY OF ACUTE GANGRENOUS INFECTIONS OF ANIMALS.

Hilda Hempl Heller. Jour. Infect. Diseases, vol. 27 (1920), pp. 385-451.

In this very interesting article the author reviews the three great groups of anaerobic invading microorganisms found during the world war in human wound infections. Of these three groups the writer has placed the *Vibrion septique* as being first in incidence in animal infections. Blackleg is placed second in incidence in the anaerobic animal infections. The writer has examined thirteen specimens of bovine muscle tissue all of which yielded the blackleg organism. In three instances the *Vibrion septique* organism was also isolated, as well as the blackleg organism. In no instance was a pure *Vibrion septique* infection found.

The author has also studied fifteen cultures of anaerobic microorganisms recovered from cattle by different individuals. Ten of these cultures were found to be *Vibrion septique* strains, and five were found to be blackleg strains.

Eleven dried sheep muscle tissue samples and one culture recovered from sheep constitute the investigations made by the author on the anaerobic infections in sheep. The one specimen originating in the United States proved to be blackleg, while the other ten received from Europe and labeled "Bradsot" were found to be *Vibrion septique* infections.

In so far as the theme of this paper is concerned, the sheep investigations if presented in the abstract would be misleading, since practically all of the instances given were cases of European bradsot infections, and do not represent the anaerobic infections found in sheep in this country.

Throughout this article the author contends that spontaneous *Vibrion septique* infections in cattle and sheep are common, presumably because in the examination of thirteen samples of bovine muscle tissue, three *Vibrion septique* strains were isolated in addition to the blackleg organism. The author is of the belief that in these three instances the animals in question died as a result of a mixed blackleg-*Vibrion septique* infection. In spite of the fact that in no instance was a pure *Vibrion septique* infection encountered and on the strength of the three cases of alleged mixed infection, the writer draws the rather remarkable conclusion that the veterinarian does not know blackleg disease

when he sees it, that the majority of the veterinary profession has misunderstood the etiology of the anaerobic invasions of cattle, or must deliberately include, when making a diagnosis of blackleg, all infections caused by the *Vibrio septique* group of organisms, as well as the blackleg organisms.

In view of the seriously faulty technique employed by the author in insulating the anaerobic microorganisms from the tissue specimens examined, together with the lack of evidence to support the conclusions drawn, it is more than probable that the writer's judgment concerning the anaerobic infections in animals is as badly warped as is the expressed opinion that "the attitude of the veterinary profession has been that we already possess all the necessary knowledge concerning blackleg."

Most certainly the judgment of one so inexperienced in the anaerobic infections of animals can not be taken seriously or in any degree to alter the mature judgment of those investigators who for years have studied these diseases in the field as well as in the laboratory.

W. S. GOCHENOUR.

AN INVESTIGATION INTO THE PURITY OF AMERICAN STRAINS OF *BACILLUS BOTULINUS*. George F. Reddish. Jour. Infect. Diseases, vol. 29 (1921), pp. 120-131.

The author calls attention to the fact that descriptions of *Bacillus botulinus* by various investigators of this country differ markedly in certain respects from those of European investigators. In his study of this organism, the author employed nineteen different strains of the organism obtained from various laboratories in different sections of the United States. In every instance but one, impurities in the culture were observed in the stock strains, the contaminant having all the characteristics of *Bacillus sporogenes*. When *Bacillus sporogenes* and *Bacillus botulinus* are present in the same material, they are so closely associated that it becomes a difficult task to separate them, the former, being the less fastidious of the two, is favored by the method of isolation generally used by American workers. The author's results explain clearly the reasons for the sharp differences noted in the descriptions of the organism given by the European and American investigators. Furthermore, the use of impure cultures in the making of antiserum is unsatisfactory

and may account for the absence of uniformity in the results of treatment of botulism victims. Thus, the use of antiserums in the prophylaxis of botulism has given good results experimentally in some instances, but it has not as yet been pronounced a success in actual practice. The toxicity of the strains of *Bacillus botulinus* which are contaminated with *B. sporogenes* will vary with the age of the culture and with the proportion in which the contaminant is present.

The author summarizes his work as follows:

Nontoxic strains were isolated from 18 out of 19 so-called "strains" of *B. botulinus* examined. These nontoxic isolations were proved to be *B. sporogenes*.

Isolations of *B. sporogenes* were made from stock "strains" of *B. botulinus* by 4 different methods, that is, by the use of anaerobic plates, simple dilution, aerobic plates with *Staphylococcus aureus*, and by heating in order to kill vegetative forms after the spores of *B. sporogenes* had been formed.

"The "strains" of *B. botulinus* examined resemble morphologically and in their action on meat mediums and milk, pure cultures of *B. sporogenes*, except that the action of *B. sporogenes* is more rapid, and in some cases carried nearer to completion.

CALCIUM AND TUBERCULOSIS IN RABBITS. R. Massini. Schweiz. Med. Wchnschr., vol. 161 (1921), p. 233. Abs. in Amer. Rev. Tuberc., vol. 5 (1921), p. 102.

Massini injected young rabbits with calcium chloride after they had been inoculated with tuberculosis, and found that they lived a little longer than the controls.

A SOURING OF BEEF CAUSED BY BACILLUS MEGATHERIUM. Hubert Bunyea. Jour. Agr. Research, vol. 21 (1921), pp. 689-698.

The author has made an interesting study of a condition known as "sour beef" which occasions no little economic loss, especially to firms which have no facilities for the storage of meat to prevent this alteration. As a result of his studies, the following conclusions were drawn:

The phenomenon known as the souring of beef is a bacterial one.

The organism responsible for the souring of beef is *Bacillus megatherium*.

Bacillus megatherium will sour beef under a wide range of temperature, but not in the absence of oxygen.

In the souring of beef by *Bacillus megatherium* propionic acid is produced.

Bacillus megatherium is nonpathogenic for experimental animals (rabbits and guinea pigs) and does not produce an appreciable amount of toxin when propagated upon raw beef.

DISTEMPER IN THE PIG. J. P. M'Gowan. Scot. Jour. Agr., 1920, vol. 3, No. 4, p. 407.

This paper discusses an epidemic, among pigs, of what the author terms distemper, the disease which is usually observed in dogs and cats. The origin of the infection was traced to newly purchased sows which were suffering from mild "colds," thought to have resulted from the train journey. However, in about a fortnight after the first of these sows had farrowed the disease broke out among their pigs in a very severe form. Later the infection spread quite generally to all the young pigs in the piggery.

The symptoms in the older animals were usually mild, consisting of lack of condition, a soft, husky cough, and sometimes a definite paresis of the hind quarters. Recovery was the rule. In young pigs the symptoms were much more marked and the mortality was high. There was sneezing, eyes reddened, mat-tery, and lids gummed together; discharge from the nose, and a husky cough. In some cases there developed red papules on the skin, which later became tipped with scabs. In late stages of the disease there was slight diarrhea and sometimes paralysis, particularly of the hind quarters. The sick animals had a "doggy" smell similar to that present in distemper of dogs.

Postmortem examinations on a number of pigs showed quite constantly pneumonic lesions of greater or less extent. No pathological alterations were found in the abdominal organs. Bacteriological examination of the trachea and lungs yielded cultures of the distemper organism (*Bacillus bronchisepticus*) in all cases. The heart blood was sterile.

The disease was effectively controlled by enforcing strict sanitary measures. These included frequent spraying of walls of

sties, passages of pig houses, etc., with hot lime wash; confining pigs to their own sties; removing sows about to farrow to a clean, lime-washed house; avoiding transferring infection on utensils, feed, and person of caretaker; keeping dogs and cats out of pigs' houses; killing off hopelessly ill pigs. In addition to these, a vaccine prepared from various strains of the distemper organism was used. It was recommended that pigs should be injected about four days after their birth. L. T. GILTNER.

THE USE OF A TWO PER CENT WATERY SUSPENSION OF ANIMAL CHARCOAL (CARBO MEDICINALIS MERCK) IN LUMBAGO (AZOTURIA). D. Detlefsen. Berlin Tierärztl. Wehnschr., vol. 37 (1921), no. 27, p. 315.

A case of azoturia was treated by injecting 200 c.c. of a 2% watery suspension of animal charcoal intravenously. In the course of a half hour following the injection the symptoms were aggravated, but after three or four hours the condition of the patient improved, and on the second day of the attack the horse had practically recovered.

In septic diseases and in catarrhal fever of the upper air passages, the same treatment gave good results. In all instances it has proved harmless and the cost is insignificant. Doses of 100 to 200 c.c. are recommended. L. T. GILTNER.

REVIEW

LABORATORY MANUAL IN GENERAL MICROBIOLOGY. Prepared by the Laboratory of Bacteriology and Hygiene, Michigan Agricultural College, Ward Giltner, Head of the Department. Published by John Wiley and Sons, Inc., New York. Price \$3.50.

This is a second edition of the Laboratory Manual in General Microbiology issued in 1915. A comparison with the first edition shows that the author and his coworkers have added greatly to the excellence of their previous work. The steady advance of knowledge in microbiology and laboratory technic requires that standard books on these subjects be kept up to date. That the author is alive to this fact is shown by the ex-

tensive revision and the mass of new information which the work contains.

That a book of 472 pages, including 42 pages devoted to the index, and a large, valuable list of references, can encompass so great a fund of practicable information is a tribute to the concise, clear manner of expression of the author. The exercises are enlivened by frequent, appropriate explanations for the steps taken or agents used.

The purpose of the manual is to supply the student with detailed information which will make him more independent in the course of his laboratory work. The subject matter is divided into three major parts and an appendix. Part one is primarily for the purpose of giving a working knowledge of laboratory methods used in the study of microorganisms, including molds, yeasts and bacteria. Part two consists of exercises demonstrating the various physiological activities of microorganisms. Part three deals with applied microbiology and includes exercises on the microbiology of air, water, sewage, soil, the dairy, plants, and exercises on animal diseases and immunity. All told, the three parts contain 129 well-chosen exercises accompanied by a profusion of helpful illustrations.

Detailed instructions are given for the various biological tests, and for the preparation of important diagnostic agents, toxins, antitoxins, bacterins and vaccines.

A 100 page appendix gives numerous formulae, tables and a wide variety of information of great value to the laboratory worker. A book of this character not alone fills the purpose for which it was primarily intended in a most satisfactory manner, but finds a ready place in all bacteriological laboratories because of its value as a reference text on laboratory technic.

Years of teaching and laboratory work in their several specialties have given the author and his associates an opportunity to study the requirements of students in general microbiology, and the book represents an accumulation of their observations and material obtained from the best sources of microbiological knowledge.

B. A. G.

ARMY VETERINARY SERVICE

EXAMINATION FOR APPOINTMENT

An examination for appointment as second lieutenant, Veterinary Corps, Regular Army, will be held November 14, 1921, throughout the continental limits of the United States, to fill sixteen (16) vacancies, under the following provision of law: "Appointments in the Veterinary Corps shall be made in the grade of second lieutenant from reserve veterinary officers between the ages of twenty-one and thirty." (Sec. 24*e*, Act of June 4, 1920.)

Applications for this examination will be made on the blank form for application for a commission in the Regular Army (Form 88, A. G. O.). This blank form may be obtained at any military post or station or from Corps Area Commanders, or from the Adjutant General of the Army, Washington, D. C.

Applications, after completion, will be forwarded to the Commanding General of the Corps Area in which the applicant resides or to the Commanding Officer of the nearest military post or station of the United States Army. In case the post or station commander receives an application he will immediately forward it to the Corps Area Commander.

It will be noted that the law quoted in the first paragraph requires that applicants for appointment be selected from reserve veterinary officers. Consequently, if an applicant is not a member of the Veterinary Officers' Reserve Corps, he will, before examination, make application for membership direct to the Adjutant General of the Army, Washington, D. C., stating that the appointment in the Officers' Reserve Corps is desired to make him eligible to take the Regular Army examination.

In addition to being a member of the Officers' Reserve Corps, an applicant must be between the ages of twenty-one and thirty years at the probable time of appointment, which will be about two months after the examination. He must also have a satisfactory general education, must be a graduate of an acceptable veterinary college, legally authorized to confer the degree of Doctor of Veterinary Medicine, or its equivalent, and which requires students to have covered satisfactorily a four years' high school course, or its academic equivalent, as a minimum

entrance requirement, and which maintains this course of instruction covering a period of four years of not less than seven months in each year. The applicant must also have had, subsequent to graduation, at least one year's experience in the practice of veterinary medicine, or its equivalent in hospital work, or as an instructor in an approved veterinary college, or as an employee of the Bureau of Animal Industry of the United States Department of Agriculture, actively engaged in veterinary professional work.

AN ARMY VETERINARY PICNIC

The Army veterinary officers attending the School of Meat and Food Inspection in Chicago gave a very delightful picnic in Jackson Park on the afternoon of September 22. Those present were Colonel and Mrs. Steel, Major and Mrs. Hill, Major and Mrs. Jewell, Captain and Mrs. Whitney, Captain and Mrs. Houston, Captain Eakins, Lieut. and Mrs. Juzek, Lieut. and Mrs. Lovell, Lieut. and Mrs. Curley, and Lieut. and Mrs. Herbott. Lieut. Wolf, a lone bachelor, managed to forget his loneliness with two young ladies. Dr. and Mrs. A. H. Baker, Dr. and Mrs. D. M. Campbell, Dr. and Mrs. N. S. Mayo, Miss Dorothy Mayo, and Miss Marguerite Jones were also guests.

This year a careful watch was kept on Dr. Campbell and the base of supplies was not raided. There was surely some "chow." A bushel of fried milk-fed chicken "an' everything."

After a successful attack on the eatables Mrs. Baker made a motion that all the civilian veterinarians present join the Army, where they would have such fine eats and nothing to do. This started hostilities immediately, but owing to the excellent organization of the veterinary corps the civilians were willing to refer the matter to the Disarmament Convention in Washington.

After the treaty of peace had been concluded a delightful time was spent conversing until dark, when a swarm of Hun mosquitoes from "no man's land" made a concerted attack. As silk hose is not an efficient protection the forces, both military and civil, were withdrawn to previously prepared positions.

N. S. MAYO.

AMERICAN VETERINARY MEDICAL ASSOCIATION

Proceedings of Fifty-Eighth Annual Meeting, Denver, Colo., September 5 to 9, 1921

MONDAY MORNING, SEPTEMBER 5, 1921

The first session of the fifty-eighth annual meeting of the American Veterinary Medical Association convened at 9:45 a. m. in the City Auditorium, Denver, Colorado, President David S. White presiding.

The invocation was delivered by Rev. James E. Davis, pastor of the Central Christian Church of Denver.

PRESIDENT WHITE: Ladies and gentlemen, there are three reasons why I am very happy to introduce to you the gentleman who will deliver to you the address of welcome. The first and most important reason is that he is a near-Ohioan. He confesses to having been born as near Ohio as he could have under the circumstances, namely, the State of Michigan. (Applause.)

Secondly, he has been out in this great western country nearly half a century. A large part of this time he has been engaged in the cattle industry. Thirdly, he happens to be the Mayor of Denver. I take great pleasure in introducing to you, therefore, the Honorable Dewey C. Bailey, Mayor of Denver. (Applause.)

ADDRESS OF WELCOME

MAYOR BAILEY: Mr. Chairman, Ladies and Gentlemen, Members of the American Veterinary Medical Association: As your chairman has said, for a great many years I was in the livestock business in Colorado. My ranches were out about sixty miles southeast of Denver. A great many years ago I bought and brought a great many southern cattle into this northern country, before they shipped them on the railroads or thought they could. We drove them or traileed them across into this country and Wyoming. Texas fever was distributed over this northern country by these southern cattle. There was not a large loss by death, but it continued along the trail where these cattle were driven until veterinarians and men well experienced in that disease and in the cattle business made up their minds that there was no doubt but what that disease was brought into this country by southern cattle. So I have made up my mind since being requested to make an address of welcome that there were a great many things that I knew of that showed that the veterinarians of the United States were an exceedingly useful body of doctors of this country.

While in the ranch business I also raised a great many horses. I started in the livestock business in a very small way and grew

up with it. I can remember an old span of horses that I had started with that were as loyal and faithful and trustful and hard-working a team as a man ever saw. I loved them. I loved a great many of the horses that became personal pets of our family as the years rolled by, but especially this team that never failed me, helped me make a living, and honestly (that was forty-odd years ago), I dream of that old team occasionally yet. They made such an impression on me that I never forget them and never will.

Of course, in handling a great many of these horses, raised in this country, I had use many times for the veterinarians. Since I have been Mayor, before our fire department was motorized, we had all the way from 100 to 165 head of horses. I came in contact with a number of veterinarians in that way, and especially Dr. Dunleavy, who looked after our horses; and I want to say that the help and kindness shown to these dumb animals, the most loved, the most intelligent and hardy of any animal grown in the world, makes me see what a great necessity there has always been for veterinary surgeons.

I am not disposed to make a long talk. I know you are here for business. The good people of Denver, through their Mayor, extend to you greetings and a most hearty welcome to Denver. We hope this convention will be successful in its work and duties. We hope you will like our city, as I am sure you will. Where else could you see such a morning as we have here this morning—cool, the air bracing?

Denver is a city of 270,000 people. Times are good here notwithstanding the reports that you hear from other sections of the country. Denver gives more free amusement to its citizens than any other city of its size that I have ever heard of. There will have been held in this city by the first day of January 90 conventions. People like to come here, and we like to have them. I wish again to extend to you a most hearty welcome to the City of Denver. (Applause.)

RESPONSE TO ADDRESS OF WELCOME

PRESIDENT WHITE: Dr. H. E. Bemis, of Ames, Iowa, will respond to the Mayor. (Applause.)

DR. BEMIS: Mr. President, Mayor Bailey, Ladies and Gentlemen: I learned to take orders from Colonel White during the war, and no matter how difficult the task was that he asked me to do, all I could do in those days was to salute, say "Yes, sir," and proceed to do the best I could. I remember when we were in France when he got tired of office duties he would start for a trip to the front, knowing full well when he left that the waiting list in the horse hospitals of France was longer than the waiting list in the hotels of Denver at the present day. However, in spite of that fact, about the second day after his

departure I would receive a telephone message to prepare to receive about three thousand animals within the next twenty-four hours. Of course, all I could do was say "Yes, sir," hang up the receiver and proceed to do the best I could. But I did have one other loophole in those days, and that was to practice the good old army method of passing the buck, and simply get busy on the telephone and distribute these animals to a number of the already overerowed hospitals.

So in this instance, when I received word a few days ago that the President expected to have me make the response to the address of welcome, I simply said to myself, "Well, the Colonel has got 'em again! When, oh when will this cruel war be over?" But this time I was not able to pass the buck.

To think of being welcomed to a city like Denver and a State like Colorado, with apologies to our friend Briggs, "Ain't it a grand and glorious feelin' " simply to be here? Why, sir, you couldn't keep us out! We have been prepared to come to this city and this State for the last five years, by the wonderful word pictures of our good friend Dr. Glover. You may think we didn't want to come to Denver because we delayed so long after his first invitation, but I assure you that was not the reason at all. We were simply so inspired by his oratory that we wanted to wait for the grand finale which he gave us last year in Columbus, in spite of the effort of as good a State as Iowa, when he landed the convention, and we are glad to be here and be welcomed here today.

Colorado has the opportunity and has learned the happy lesson of combining work and play. This State, as we all know, is called "the Playground of America," "the Switzerland of America," and yet Europe can boast of no such pageant as the Rocky Mountains show us every day from the streets of Denver or from the trips which we are to enjoy. The land of magnificent heights, of awe-inspiring depths, of roaring waterfalls and laughing brooks and ozone-laden air and rejuvenating waters—we realize and appreciate them all. Surely the Creator has expressed himself in superlatives in the State of Colorado, and without any stretch of the imagination we can believe with Shakespeare that there are "tongues in trees, books in the running brooks, sermons in stones, and good in everything."

But there is another reason, perhaps a more special reason, why this particular body should be glad to come to Denver and to Colorado, it seems to me, and that is on account of the name and fame of this State in her industries. We have long known of her resources in iron and coal, gold and silver, and the precious metals, but we are more particularly proud of her accomplishments in agriculture and in the good ally of agriculture, veterinary medicine.

Colorado has many special problems to solve in veterinary

medicine. Some years ago she came to Iowa to get someone to head the work, and for a good many years the rest of America has watched these men and their progress and has been proud of their accomplishments. It is a gratification to know that Dean Glover and his corps of workers, and Dr. Lamb and his workers, and the practitioners of the State of Colorado, though few in number, yet large in efficiency and earnestness and enthusiasm for the work, have been able to make their impression upon such people as Mayor Bailey, and I am sure upon the State as a whole. So it seems to me that we should be particularly proud and happy to come to Colorado to do these men honor, and it is our hope that the presence of this body in this city will give them new inspiration for the work which lies ahead.

I am sure, Mr. Mayor, it is the pleasure of all present to thank you for your gracious welcome to the City of Denver and to the State of Colorado. (Applause.)

PRESIDENT'S ADDRESS

PRESIDENT WHITE: The next item on the program is the President's address.

(President White delivered his address. It was published in THE JOURNAL for October, 1921, page 9.)

PRESIDENT WHITE: The next item on the program is the presentation and adoption of the minutes.

SECRETARY MAYO: I hereby present the official report of the last meeting at Columbus as the report of that meeting.

(On motion of Dr. Munce, seconded by Dr. Kelley of Albany, N. Y., the minutes were adopted as the official report of the preceding meeting.)

Adjournment.

MONDAY AFTERNOON

GENERAL SESSION

The meeting convened at 1:30 p. m., President White presiding.

REPORT OF EXECUTIVE BOARD

PRESIDENT WHITE: The first item is the report of the Executive Board, which will be presented by the Secretary.

(Secretary Mayo read the list of applications for membership.)

(On motion of Dr. Kinsley, seconded by Dr. Connaway, it was voted to suspend the rules and instruct the Secretary to cast the ballot of the Association for the election of the persons whose names had been read.)

PRESIDENT WHITE: Is there any further report from the Executive Board?

SECRETARY MAYO: I have here the applications of Dr. W. F.

Klee of Lima, Peru, a graduate of Royal Veterinary College of Copenhagen, Denmark; Dr. Carlos Lloveras of Buenos Aires, Argentina; Dr. L. Santa Maria, Pedros Negras, Mexico, graduate of the National Veterinary College of Mexico; Dr. H. P. Shepard, Killeen, Texas, graduate of the Southwestern Veterinary College, 1916; Dr. W. R. Smith, North Brookfield, Mass., graduate of Harvard Veterinary College, 1898; Dr. E. H. Sterling, Uruguay, graduate of the National Veterinary School of Uruguay.

These gentlemen are graduates of veterinary schools that are not recognized by the Association. Four of them, I think, are graduates of national veterinary schools of other countries. One is a graduate of Harvard. That veterinary school is no longer in existence; in fact, it went out of existence before this Association had an accredited list of veterinary colleges, although I think graduates of that school have always been admitted. The Southwestern Veterinary College is no longer in existence. When a veterinary school has gone out of existence the Constitution and By-Laws provide that the graduates may be elected to membership under suspension of the rules five years after the college has suspended. The Executive Board recommends that the rules be suspended and these men whose names I have read be elected to membership.

(On motion of Dr. H. P. Hoskins, seconded by Dr. Connaway, the recommendations of the Executive Committee were approved and the persons whose names were read were admitted to membership in the Association.)

SECRETARY MAYO: It is recommended by the Executive Board that the Constitution and By-Laws be amended as follows:

Section 7, Article G, by adding: "Excepting members residing in countries other than the United States and Canada, the said ballot shall be returned in ninety days after the date of issue."

This section deals with the election of members from the various representative districts. We have members in the Philippines, and it is impracticable to get a ballot to the Philippines and get it back within the sixty days provided by the Constitution and By-Laws. Another district aside from the one including the Philippines is South America, so that there are really two districts that will be affected by this. The recommendation is simply to change the Constitution and By-Laws to give ninety days' time to get a ballot to and from these foreign countries.

Another recommendation for a change in the Constitution and By-Laws is that Article 11 of the By-Laws be changed by adding: "Excepting the Editor, Secretary, Business Manager and Treasurer, who shall assume their duties within thirty days following their election."

At present the Constitution and By-Laws provide that the officers shall assume their duties immediately upon election. The annual meetings of the Association come just about at the closing of the fiscal year, or the beginning of the fiscal year, which is on the 1st of September. At this time the dues are being collected from the members and there is an immense amount of work connected with these offices. It makes it impracticable to change them immediately at that time. They really have to have a little time to get things entered and straightened out. It has been customary for several years to have the old Secretary hold over until the end of the month and get things in shape for his successor. That is to provide for that.

Another recommendation by the Executive Board is to change Article 5, Section 5, to read: "That the Treasurer shall give an acceptable bond to the Executive Board."

At present the Constitution and By-Laws provide that the Treasurer shall give an acceptable bond in the sum of \$10,000. On the recommendation of the Treasurer last year, the Board increased that bond to \$25,000, the amount of money, approximately, in the treasury of the Association. You will note that this recommendation does not specify any amount that the Treasurer shall give bond for. That is left entirely to the Executive Board. If they should have \$50,000 they can then demand a \$50,000 bond.

PRESIDENT WHITE: You have heard the further report of the Executive Board. This may be received now and will lay on the table until the next annual meeting.

(On motion of Dr. Kinsley, seconded by Dr. Hoskins, the recommendation of the Executive Board was accepted and the recommendations for amendment were laid on the table.)

SECRETARY MAYO: The question of the ethics of certain forms of advertising has been brought up by members of the Association. This refers particularly to advertising by moving pictures, and the Executive Board recommends that advertising by moving pictures, except the veterinarian's name and address, should be considered unethical.

PRESIDENT WHITE: You have heard the report in regard to advertising through the medium of the moving picture. This would constitute an amendment to Article 19 of the Code of Ethics.

SECRETARY MAYO: I hardly think it would be considered an amendment, but rather an interpretation of the Code of Ethics.

PRESIDENT WHITE: Moving pictures do not seem to be specifically included. If you desire to take it as an interpretation, it would not be an amendment.

SECRETARY MAYO: I think it would be a great help. Some firms supply veterinarians with slides and films, dealing, we will

say, with hog cholera, in which the veterinarian's name appears in connection with certain brands of serum. The matter was brought to the Secretary's attention by the Resident Secretary from this State. The Secretary doesn't like to pass the buck, but sometimes I like to have some backing in the matter. At other times matters have come to my attention and I have taken them up with the manufacturers. These slides and films will go out to veterinarians in country districts, and sometimes they don't consider whether it is a violation of the Code of Ethics or not. One of the manufacturers, in reply to my request that he discontinue it because I didn't think it was ethical, said that he wanted to do what was ethical, but he would like to have this Association's opinion on it. That is why it was brought to the Executive Board and to the Association for an expression of opinion.

PRESIDENT WHITE: The Chair will recognize expression of opinion in regard to this action of the Executive Board concerning the use of the moving picture as a medium of advertising.

DR. EICHHORN: I move that recommendation of the Executive Board be adopted.

DR. JENSEN: I would like to hear that recommendation again. I presume this attack is directed at the firm I represent. The Government has been using posters to encourage and stimulate the farmers to vaccinate hogs, and in order to help out the idea promulgated primarily by the Government we took it up and offered to get our friends these slides. Considerable criticism arose, and when we heard of it, we advertised it and put it in our little paper. Dr. Mayo, I think, had written a letter saying that it was not considered ethical. That is as far as we are connected with it. When we took the matter up we thought we were rendering a real service to the country and to the hog raisers.

DR. GEORGE HILTON (Canada): Section 5 of Article 19 of the Code of Ethics distinctly states that in advertising the veterinary surgeon shall confine himself to his business address. It also states that advertising specific plans of treatment, medicines, advertising through the medium of posters, illustrated stationery, or newspapers, will not be countenanced by the Association. I think the first sentence in that section defines exactly how far we can go in advertising matters. I, therefore, second the motion that the Executive Board's recommendation be accepted.

SECRETARY MAYO: For Dr. Jensen's information I may say that some firms supply posters, for instance.

DR. JENSEN: That leaves me out.

SECRETARY MAYO: Some firms supply little posters with prancing hogs and grinning hogs, with the veterinarian's name. With one firm particularly, I took it up. I wrote them as nice a letter

as I could, telling them I didn't think it was ethical and that I thought they were leading some young veterinarians astray, so to speak. They said they didn't want to do that and so on, but they rather questioned my judgment in the matter and said they wished the American Veterinary Medical Association would take it up, and that they would stop if the Association said they should.

DR. CONNAWAY: It seems to me that there is a rather deeper and more vital matter concerned in this. The moving picture is certainly a fine means of education of the laity on many of these things on which they should be educated. It seems to me that we are opening the way for carrying to the farmers much misinformation about the ways and means of controlling animal diseases. I see in the room just back of you certain methods of treating contagious abortion, for instance, which to my mind, if those doctrines are spread through moving pictures and in other ways, will carry a menace in a very forceful way. I think we ought to be very careful as to how we back up the advertising business to the laity by commercial concerns and through their agents, the practitioner who may be using their products. This is a more important thing than the simple question of whether some individual practitioner is ethical or not. This is a matter I would like to see thrashed out.

DR. L. L. GLYNN (Monte Vista, Colo.): I am Resident State Secretary for this State, and, as Dr. Mayo said, he passed the buck to me. The reason I brought this proposition up was that I had been asked whether that would be ethical. The reference was made by firms supplying serum, and the advertising of the slide would be confined strictly to that firm, but the veterinarian's name would appear at the bottom of the slide as the agent supplying that particular serum. I didn't think the thing was ethical advertising, and hence referred to the Secretary. That is the reason I wrote the letter and probably the reason why so much was stirred up. I didn't think that any but authorized agents for that particular firm should have their names connected with the particular firm supplying the serum.

(It was voted, on motion of Dr. Eichhorn, seconded by Dr. Hilton, that the report of the Executive Board regarding moving picture advertising be adopted.)

SECRETARY MAYO: The question of appointing a special committee to help formulate a Federal Narcotic Law was referred to the Executive Board, and they recommend that the President be authorized to appoint a committee, not to exceed three, to confer with the representatives of other associations on the revision of the Federal Narcotic Law.

(It was voted, on motion of Dr. Eichhorn, seconded by Dr. Adams, that the recommendation of the Executive Board with reference to the Federal Narcotic Law be accepted.)

SECRETARY MAYO: The question of publishing a directory of members with the Constitution and By-Laws was considered for the coming year, and in view of the financial condition of the Association it was recommended that the names of the new members be published in the JOURNAL of the Association, also the names of the new committees, the resignations, deaths, etc., and that no directory be printed this year.

(It was voted, on motion of Dr. Kinsley, seconded by Dr. Hoskins, that the recommendation be accepted.)

SECRETARY MAYO: This is a report of the Executive Board meeting in Chicago last November of which most of you have been informed through THE JOURNAL. At the suggestion of Treasurer Jacob, it was moved that the bond of the Treasurer of the American Veterinary Medical Association be increased to \$25,000, which was done.

SECRETARY'S REPORT

PRESIDENT WHITE: That concludes the report of the Executive Board. The next item is the report of the Secretary.

(Secretary Mayo read his report, as follows:)

The Association has now an active membership in good standing of 3,935, and 39 honorary members. During the past year 17 members have died, 12 resigned and 17 have been reinstated. Three hundred sixty-three have been dropped for nonpayment of dues. There are about 225 applications for membership this year.

The general economic depression that prevails has had a marked influence upon our membership, as it has on practically all associations. One large and influential organization has reported a loss of 25 per cent of its membership during the past year. The number of members who have delayed sending in their dues is greater than ever before, in spite of special efforts to collect them, and the number of letters expressing financial stress has been much greater than usual.

The interest in the Association and its work has been excellent.

The expenses of the Secretary's office, aside from the Secretary's salary, may be classified as follows:

Printing and stationery.....	\$1,438.41
Clerical help.....	668.27
Postage	378.36
Office supplies.....	71.27
Incidentals	11.92
Freight and hauling.....	64.57
Storage charges.....	21.00
Buttons for the meeting.....	18.00
Expenses of Columbus meeting.....	150.30

The printing and stationery item includes stationery not only for the Secretary's office but also for Resident Secretaries and various committees, and also for printing the directory of the members, committees and officers of the Association, as well as the Constitution and By-Laws. Four thousand five hundred copies were printed, and a copy was sent to each member of the Association. A few copies were sold. Previously the directory with the Constitution and By-Laws had been published with the proceedings of the Association in an "Extra Proceedings Number" of the JOURNAL OF THE A. V. M. A.

On account of the ruling of the Postmaster General, it was not possible to follow the plan previously in force. The cost of printing the directory was \$560, and the postage for mailing was \$80, a total of \$640, which was charged to the General Association Fund. This expense had been previously carried on the Journal Fund.

Your attention is called to the fact that the influence of the A. V. M. A. is extending to other countries, and this year we have applications for membership from Mexico, Uruguay and Argentina. Practically all countries in the Americas are represented in our Association, and we have members in various parts of the world. If notices were inserted in some foreign journals calling attention to the advantages of being a member of this Association, it is quite probable that members could be obtained from other countries and the scope and the influence of our Association could be made world-wide. There is no veterinary association in the world that compares, either in size or influence, with the American Veterinary Medical Association.

It is interesting to note that one of our members, Dr. G. A. Roberts, of Sao Paulo, Brazil, was the first to recognize an outbreak of rinderpest in Brazil, the first time that this disease has ever been reported upon the American hemisphere.

The term of the member of the Executive Board for the Fifth District expired. A postal card nomination and election was held in accordance with the Constitution and By-Laws. The following were nominated: Drs. C. E. Cotton, W. F. Crewe, C. P. Fitch, W. B. Spencer and C. H. Stange. After the votes had been received and before they had been counted, a number of requests came in from members to change their ballots to some other candidate. This problem had never been presented before, and the matter was referred to the Executive Board. The Secretary was instructed by the Executive Board to count the first official ballot as it was sent in. Dr. C. E. Cotton, of Minnesota, was elected member of the Executive Board from the Fifth District.

In preparing the Constitution and By-Laws for publication in the directory, some changes appeared to be desirable. The proposed changes were submitted to the Executive Board for their consideration and will be presented in the report of the Board.

According to instructions of the Executive Board, the Secretary obtained from the former Librarian of the Board, Dr. Frost, of Ithaca, N. Y., the material that was in the Librarian's possession. Dr. Frost asked the Secretary for directions as to shipping, and was advised that if the weight of material was less than 100 pounds to send it by express; if over 100 pounds, to send it by freight. The Secretary was somewhat surprised to receive two and a half tons of books by freight. Nearly all of this was made up of printed reports dating from the year 1906. Fortunately, the material was sold for nearly enough to pay the expense.

The Secretary was instructed by the Executive Board to advertise in THE JOURNAL and to sell as many copies of the reports as he could for 25 cents each. This was done, and a few dollars' worth were sold. The balance was ordered sold for old paper with the exception of a few sets that were selected and made as complete as possible in order to supply possible inquirers.

So far as the Secretary knows, there is not a complete set of the Reports of the Association that belongs to the Association. If any member of the Association can supply reports earlier than 1890, the Secretary will be very glad to receive them and will see that they are preserved as a permanent record of the Association.

Very few complaints have been received from members who do not receive their JOURNAL promptly. The few reports that have come in have been taken up promptly with the Editor of THE JOURNAL, who

has given his hearty cooperation in getting the mailing list arranged and kept up to date. Most of the complaints received are from members who have changed their addresses and have failed to notify either the Editor or the Secretary.

It is important that we, as individual members, should render all the assistance within our power to the Editor of THE JOURNAL in helping him make it more valuable in every way.

During the past year your able President has attended a number of State and local association meetings as a representative of the A. V. M. A. This has helped very materially in bringing the A. V. M. A. into a more sympathetic and practical relationship with these associations, and this has been of mutual benefit.

With the growth and development of the Association and its widening field of usefulness there comes an increased expenditure of funds. Part of this is due to general high cost of living and part to the general tendency to expand. This is proper, provided the expenditure is warranted by the results to be obtained and the situation of our treasury. It is important that the Association as a whole in convention assembled and the individual members should carefully study the expenditures and proposed expenditures so that they may be fully informed how the funds of the Association are used.

The matter of procuring a permanent home for the Association is already under consideration by the Executive Board and will probably be put into effect before many years. It is well that we should keep this in view and be prepared to meet the obligations which this will impose.

At the last meeting of the Association in Columbus, Ohio, the distribution of the Veterinary Relief Fund was placed in the hands of the President and the Secretary of the Association. During the year relief has been given to the wife of one of our honored members who died, leaving his immediate family and two old ladies, the doctor's mother and his wife's mother, with very little means of support. Upon the recommendation of the local veterinarians in that State, as well as the Chairman of the Executive Board, the sum of \$500 was left available to the doctor's widow.

Five hundred dollars was contributed last year as an additional contribution to the Anglo-American-Franco-Belgian Veterinary Relief Association. This was acknowledged in a very grateful letter from Professor Vallée, who also sent a printed report showing in detail how the funds have been expended.

The Association has a substantial fund for the relief of needy members and their families, and any member of the Association knowing of cases where the fund can be used judiciously and effectively are urgently requested to take the matter up immediately either with the Secretary or the President.

The American Veterinary Medical Association has taken an active part in securing proper recognition for the Veterinary Corps in the United States Army. There are still some changes that should be made in order that the Corps may be more efficient, and I recommend that this matter be given consideration either by the Committee on Legislation or a special committee appointed for this purpose.

In preparing the program for the annual meeting of the Association the different sectional presidents and secretaries are expected to prepare the programs for their respective sections. In some instances articles are secured for one section that properly belong in another section. The final rearrangement depends on the Secretary of the Association. It is recommended that the chairmen and secretaries of the different sections provide their programs sufficiently early so that any readjustment that may seem best can be made directly with the officers of the sections, rather than to leave the matter until the last

moment before going to press. It is believed that this arrangement will prove more satisfactory.

You will note that the program for this meeting is not as full as for several meetings previous. Formerly the meetings have been crowded, and it was decided, after consultation with the Executive Board, that it would be better to give more time for discussion and for general business. It is hoped that this slight change will meet with the approval of all.

It is important that the membership of the Association be increased. At present approximately one-fourth of the eligible veterinarians of the United States and Canada are members. While this is a higher percentage than that of the American Medical Association, we should have a much larger membership. At present the problem of getting new members depends largely upon the Resident Secretary. Some Resident Secretaries have done excellent work and some have done practically nothing, in spite of all the stimulating efforts that I could bring to bear upon them. In this connection I wish to thank the inspectors in charge as well as officials of local associations of the Bureau of Animal Industry for their splendid assistance in getting new members. We ought at least to double our membership. There are very few students graduating from veterinary colleges at present, and we must depend upon the practitioners in the field for increased membership. Doubling our membership would not only greatly increase our revenue but would extend the influence of the Association. I recommend that this matter be given your careful consideration and that a committee be appointed to carry the plans into effect. In connection with increasing the membership, such a committee could be of value in getting new subscribers for THE JOURNAL and stimulating an interest in it.

I wish to express my appreciation for the cordial support and assistance given by the officers of the Association, the committees, the Executive Board, and individual members in carrying on the work of the Association.

(Applause.)

PRESIDENT WHITE: You have heard this very excellent report of the Secretary. What is your pleasure in regard to it?

(It was voted, on motion of Dr. Munce, seconded by Dr. Kinsley, the report of the Secretary be received and referred to the Executive Board.)

TREASURER'S REPORT

PRESIDENT WHITE: The next item of business is the report of the Treasurer.

DR. JACOB: The Treasurer's report has been prepared and printed in pamphlet form. It has been distributed among the members, and it gives detailed information regarding the Association's financial affairs.

SECRETARY MAYO: Mr. President, I have had an opportunity of seeing this report, and I think that Dr. Jacob can give a brief statement of the general financial condition of the Association, and I think the members ought to have such a brief report. There are a good many that might not understand the report as given in this formal way, and I would like to have him present such a brief report. I know he has one.

PRESIDENT WHITE: You have heard the suggestion of the Secretary that the Treasurer give us an abstract of his very excellent report.

DR. JACOB: For the benefit of the Executive Committee, so that they might understand more readily the exact status of the financial affairs of the Association, I got up a little supplemental report. To a considerable extent it is embodied in the general report. Our total balance, cash and bonds on hand, at the time that the books were closed for the fiscal year, was \$27,341.26. Out of this, \$20,000 (or about that amount) is invested in United States Government and Canadian bonds; that is, it has been the policy of the Association to purchase the bonds on an equal basis between the United States Government bonds and the Canadian bonds; consequently, \$10,000 was put into each.

We have been dividing the Association's funds into three parts, the Association proper, the Journal Fund and the Relief Fund, and have tried as nearly as possible to keep these accounts absolutely separate so that we may know without any difficulty just how each part of the Association is operated.

One of the most interesting things, probably the most important thing, for the Association to give consideration to, is that our net profit, so to speak, our net gain for the past year, for all the activities of the Association, was \$978.36. In other words, we have run practically even. This includes also the uncollected accounts, which amount to a little over \$1,250. The interpretation of that is this: Had it not been for the interest we collected during the past year, our Association would have run behind. The condition was a little bit different during the year 1920, when the net gain was \$3,329.78. So that you see we are losing ground a little bit. That is an important point and one not to lose sight of.

So far as the Association proper is concerned, the net gain during the past year was only \$47.31, practically even, and the little gain that we made was on the part of THE JOURNAL, where we made \$912.37.

That, in a few words, I believe covers the status of affairs of the Association.

It might be of further interest, however, to know just how this money is handled. As I stated at the beginning, the \$20,000 representing the face value of the bonds at maturity is, of course, held in bonds, and the interest is collected at regular intervals. It is necessary in order to meet the demands of the Association to keep a certain amount of money on check deposit, and it has been my policy to keep as small an amount of money on check deposit as it was possible to just squeeze through with, in order to be able to keep as much as possible on time deposit. The time deposits, of course, can be converted to the checking account at any time. Just at this time we have \$7,000 on time deposit.

Since the report was made out \$3,000 worth of Canadian bonds, which were short-time bonds, matured; consequently I had those cashed, and we have on time deposit just at this time \$7,000, and practically \$3,000 covering the three funds for checking.

No funds are paid by the Treasurer except on orders from the President and the Secretary covering the Association Fund, the Editor and the President covering the Journal Fund, and the President and the Secretary covering the Relief Fund.

PRESIDENT WHITE: I would like to ask the Treasurer if all of the money belonging to the Association is in the hands of the Treasurer, or is not some of it in the hands of special committees? Are there any other funds to be accounted for?

DR. JACOB: So far as I know the only money that is not in the hands of the Treasurer is the money that has been maintained by the Salmon Memorial Fund. Who is holding that money at the present time I don't know. As far as I know, that is the only one that I don't handle.

DR. J. R. MOHLER: Mr. President, I would like to say, in reply to your request regarding other funds, that the last check I sent to the Treasurer was on the 31st of July, in order that he could get it in this year's report. Since that time we have collected over \$500 in cash and \$900 in bills receivable in the form of notes. So with this \$1,400 added THE JOURNAL earnings would be a little better than the \$912 indicated by the Treasurer.

DR. JACOB: That shows our best revenue is THE JOURNAL.

SECRETARY MAYO: That is good in a way, since that report covers the matter thoroughly; but that doesn't alter the fact that the Association ought to know that we are just about running even at the present time, and that is what I wanted to bring out in this report. If the Journal Fund had published the Constitution and By-Laws last year, my funds would have been \$600 better off.

Another thing that you should know is that at present all the funds turned over to the Treasurer by the Secretary are divided on a three-fifths basis; that is, 60 per cent of it goes to the Journal Fund. My understanding is that according to the Constitution and By-Laws only three-fifths of the dues ought to be turned over to the Journal Fund. You understand that considerable revenue is derived or sent in by the Secretary aside from dues; for instance, this year there are 180 applications for membership. Each one pays \$5 initiation fee. Three-fifths of that is turned over to the Journal Fund. I have collected a few other funds from various sources that are turned in, not dues at all. That is also divided on a three-fifths basis. The Journal Fund gets three-fifths of that, and two-fifths of that goes to the general Association Fund. I am not saying this in a critical

way. It is all Association funds. It is your fund and belongs to the Association, but I thought you ought to know that.

PRESIDENT WHITE: Does any member wish to ask of the Treasurer any question?

DR. HOSKINS: The question was raised as to the Salmon Memorial Fund. I am not a member of that committee, but I can say that the funds are on deposit in the name of Salmon Memorial Fund in the Rittenhouse Trust Company. They are on time deposit and drawing interest. I believe there is about \$4,000 net fund. My father was secretary-treasurer of the committee, and the account is in the name of the fund.

SECRETARY MAYO: I think the Association ought to know, too, of a fund of \$500 that was voted, I think, at the Philadelphia meeting and was in the hands of Dr. Thomas Smith of New Jersey. It was a fund designed to afford some immediate relief to members of the Association who were starting overseas and found themselves about strapped when they got to the Atlantic coast. The balance of this fund that wasn't expended, I think four hundred thirty-eight dollars and some cents, was turned over to me by Dr. Smith, and I turned it in to the Treasurer. That, I would say, was not divided 60-40.

DR. STANGE: If I am not out of order I would like to make a motion that we extend a vote of appreciation for the services of Dr. W. Horace Hoskins as the secretary and treasurer of the Salmon Memorial Fund, and that the funds now be turned over to the Treasurer for his care.

(The motion was seconded by Dr. J. G. Eagle, and carried.)

(It was voted, on motion of Dr. Munce, seconded by Dr. Hilton, that the report of the Treasurer be received and referred to the Auditing Committee.)

REPORTS OF COMMITTEES

PRESIDENT WHITE: The next item of business is reports of committees. I will call for these committees in the order in which they are printed in the program.

(The reports of the Sub-Committee on Journal, Committee on Intelligence and Education, Committee on Legislation, Committee on Resolutions, Audit Committee and Committee on Necrology were called for, but these committees were not ready to report.)

PRESIDENT WHITE: Is the Committee on History ready to report?

REPORT OF COMMITTEE ON HISTORY

DR. J. W. ADAMS: Two years ago a committee was appointed by the Chair to write the early history of this Association and to fill in the gap up to the time when our first minutes appeared in printed form. During the first year of the committee's history quite a little work was done, but no systematic work until a year

ago, when I was reappointed chairman, and since that time I have attempted at every opportunity that I had to write such a history. The nature of the work is such that it has to be carried on by one man. The committee that is with me is perfectly willing, but it is impossible to get the data that we want through several members, and I have attempted to do that myself. During the last year I have written to members of the families of deceased founders and practitioners associated with them, and 126 letters have accumulated. I have accumulated quite a stack of newspaper articles bearing on the meetings, and a great number of private letters, and it will take some little time yet to glean from this mass of material what I am after. I am attempting to write a little biography of the men who were the founders, and an account of their professional activities, and I have accumulated quite a number of photographs of the men. At this date I can only report progress. I believe it will take about four months yet to carry that up to 1891 or 1892. There are still gaps where I have nothing to put in. That is the report of the work of that committee to the present time.

(It was voted, on motion of Dr. Fitch, seconded by Dr. Kinsley, that the report be accepted.)

(The following additional committee reports were called for but were not ready: Committee on Anatomical Nomenclature and International Committee on Bovine Tuberculosis.)

REPORT OF COMMITTEE ON ABORTION

(Dr. Fitch read the report of the Committee on Abortion, as follows:)

Last year your Committee on Abortion presented as a part of its report a resolution which was unanimously adopted. This resolution was as follows:

"Be it resolved, That the American Veterinary Medical Association strongly urges that larger appropriations for the investigation of bovine infectious abortion be made by Federal and State Governments and through such agencies as the National Research Council to make possible cooperative work by the institutions engaged in investigating this disease."

Your committee this year has directed its efforts toward carrying out the directions of this resolution. A preliminary meeting was held in Chicago early in December. At that time it was voted that data should be collected as to what institutions were engaged in the study of this disease and what phases of the infection were being investigated. It was also decided to interest, if possible, the National Research Council in the project. Correspondence was begun with Dr. C. E. McClung, who was chairman of the Section of Biology and Agriculture of the Council, also with Dr. G. W. McCoy, chairman of the Section on Medicine. After considerable effort a conference was secured with the representatives of the Council, your committee and a few other investigators. The Council appropriated a sum of money to defray partially the expenses of this conference. This meeting was held in Washington, D. C., August 4, 1921. As a result Dr. McCoy asked that a brief be prepared stating the economic losses resulting from this infection, its importance to the breeding industry, the in-

vestigations now being carried on, amount being expended in such investigations, and the facts which should be known about bovine infectious abortion and the approximate cost of such studies. These data are now being prepared by your committee and will be submitted to Dr. McCoy some time during this month. He will in turn present them before the Interim Committee of the Council. If they approve of the project as a worthy one they will initiate efforts toward securing funds for the study of this disease. These funds will probably be expended at those institutions already engaged in the study of this disease, although this is not at all mandatory. We have good reason to believe that our efforts will be successful in securing additional money to be devoted to the study of bovine infectious abortion.

The investigations of the past year have not influenced us to alter or amend the report presented to the Association by the committee last year. You will recall that the report of last year consisted of 14 short paragraphs, each concerning some particular phase of the disease. Among the 14 paragraphs, as far as your committee has been able to determine, 13 have received universal approval, and only one, the first, has been reasonably criticized. The paragraph in question is that in which the disease was named "bovine infectious abortion," and the adverse criticism is based on the fact that this name is derived from a symptom which may or may not be present. The true character of the infection seems to be a placentitis. In order to meet this objection a subcommittee has been appointed. Dr. Ch. Wardell Stiles, an expert on nomenclature, has been requested to serve as a member. The other members are Dr. E. C. Schroeder and Dr. Ward Giltner. They will report to the general committee on this question some time during the coming year. We believe that next year's report will settle this troublesome question.

Another point in last year's report which needs clarifying is that relating to the diagnosis of the disease. Another subcommittee consisting of Dr. J. M. Buck, Dr. G. T. Creech and Dr. W. E. Cotton has been appointed to study this question and submit a report with the definite purpose of standardization of methods and technique in order to avoid many embarrassing and confusing discrepancies.

A careful study of bovine infectious abortion shows that there are many phases of the disease which are still imperfectly understood. Definite information can be obtained only by carefully conducted experimental work. Because of the character of the disease and the species of animal affected, research studies are very expensive and reliable results slow to obtain. Your committee feels that all available efforts should be directed toward aiding such studies and assisting in solving the problems in connection with bovine infectious abortion, which is of the greatest economic importance to the livestock industry.

C. P. FITCH, *Chairman.*

E. C. SCHROEDER.

WARD GILTNER.

J. F. DE VINE.

HERBERT LOTHE.

PRESIDENT WHITE: You have heard this excellent report of the committee. What is your pleasure in regard to it?

(It was voted, on motion of Dr. Connaway, seconded by Dr. Adams, that the report be accepted.)

DR. EICHHORN: I desire, in view of the importance of this question which the committee has now under consideration and the necessity of the continuation of the work, to move that this committee be continued and a sufficient fund be provided for the work for the coming year.

(The motion was seconded by Dr. V. A. Moore.)

DR. STANGE: I would like to ask what we mean by sufficient funds. In view of the financial situation we are facing, I think we ought to be careful, because we must remember we have a Budget Committee that considers all expenditures of the Association for next year, so I would like to amend that motion, unless it is pretty well understood, that the Budget Committee decide the amount.

DR. EICHHORN: That was understood.

DR. STANGE: With that understanding I will be glad to withdraw my amendment.

(The motion was put and carried.)

COMMITTEE ON INTERNATIONAL VETERINARY CONFERENCE

PRESIDENT WHITE: We will hear from the Committee on International Veterinary Conference, J. R. Mohler, chairman.

DR. MOHLER: The secretary of the committee will make the report.

DR. EICHHORN: The committee has not had any occasion to do any work in the past year, for the reason that in the report of the committee of last year we pointed out that Great Britain was very anxious to have the next International Congress held in London again. Great activity has been started to reestablish the International Veterinary Council, but up to date it has not been accomplished, principally due to the fact that our esteemed colleagues, particularly of France, would not reestablish intercourse with the German veterinarians. Our last year's report also requested that this committee be continued, not for the reason of inviting the next International Congress to the United States, but in case it should be decided to have the International Congress anywhere in Europe. This committee could resume work immediately and establish a committee for the United States to cooperate with the International Congress wherever it would be decided to have it. For this reason we believe that a committee should be continued, and it is possible, in fact it is now almost certain, that a member of this committee will visit various countries in Europe next year, and it might be well to obtain the sentiment with regard to the next International Conference.

(It was voted, on motion of Dr. Fitch, duly seconded, that the report be accepted and the committee continued.)

REPORTS OF COMMITTEES

PRESIDENT WHITE: Is the Salmon Memorial Committee ready to report?

(The committee was not ready to report.)

(The Liautard Memorial Committee was not ready to report.)

PRESIDENT WHITE: The Committee on Emblem.

DR. S. E. BENNETT: I am about the only member of the committee present. I have not been able to do anything. I have received no replies from my inquiries. There have been two or three designs submitted from different sources. If possible, I would suggest that you appoint one or two members present here to meet with me and we will make the report at some other time. I move that two members present at the convention be appointed to act with me. I suggest Dr. McKenna, who has taken considerable interest and submitted designs.

(The motion was seconded by Dr. Kinsley and carried.)

PRESIDENT WHITE: The Chairman will appoint two appropriate members for this committee.

The Committee on Unofficial Veterinary Remedies, Dr. H. J. Milks.

DR. H. D. BERGMAN: Dr. Milks has this report and I believe has not yet arrived.

PRESIDENT WHITE: Is Dr. Dick here, who is our representative on the Board of Managers of the Horse Association of America?

SECRETARY MAYO: In connection with that, I think the Association ought to know that this Association is a member of the Horse Association of America. They bought ten shares of stock last year at the Columbus meeting, costing \$50. I supposed when we bought the stock that was all there was to it. It seems that when you buy \$50 worth of stock you agree to pay \$50 a year. That has been paid. I looked up and found we obligated ourselves, and I am sure the Association is willing to put that into it.

DR. JACOB: I believe that is for a period of three years.

SECRETARY MAYO: I think you will be interested to know that Dr. Santa Maria, who was elected to membership, is the official representative of the Mexican Government to this meeting. (Applause.)

Adjournment.

(Proceedings to be continued.)

President Kinsley has appointed Dr. Cassius Way, of New York City, as member at large on the Executive Board of the A. V. M. A., to fill the vacancy made by Dr. Kinsley's accepting the presidency of the association. Dr. Way has resigned from the Committee on Intelligence and Education.

President Kinsley has appointed Dr. James Fleming a member of the Committee on Intelligence and Education, to succeed Dr. L. Enos Day, and Dr. J. S. Koen to fill the unexpired term due to the resignation of Dr. Way.

ASSOCIATION NEWS

DENVER DOINGS

At the Wild West show at the foot of the Rocky Mountains, after numerous Westerners had been thrown from an outlaw broncho, the manager announced by megaphone before the grandstand that he had been requested to call for Col. David S. White, the champion broncho-buster of Ohio, to undertake to ride the outlaw. This was the only instance during the meeting when anyone succeeded in "getting the goat" of our effusive and irrepressible president.

The horse has not been driven from streets and farms by the auto, declares a report submitted by the Horse Association of America to the Denver Convention. The report stated that horse equipment costs less than that for motors and that trucking companies and farmers find that certain parts of their work can be better done by horses than by motors. The result is that the demand for draft horses is found to be increasing.

To show this, Chicago was quoted as a representative example of American cities. In Chicago in 1920 there were approximately 30,000 horses in business, and in 1921 there are 33,000. The report disclosed a nation-wide campaign by the association to bring horses back into popularity, and also to increase the production of horses, which shows a startling decrease for the last three years.

On the door of a restaurant frequented by many of the conventioners was a sign reading: "Let your conscience be your guide; pay the cashier before leaving."

Major John H. Blattenberg was greatly missed at the convention, as the Westerners had planned to pull off a jack-rabbit game and a snipe drive, with the Major as master of ceremonies.

A Missouri delegate to the convention reported seeing a woman, who had just come from the municipal market, with a live chicken under her arm, stop to give it a drink at a sanitary drinking fountain near the convention hall.

The only accident which happened during the famous automobile trip to Lookout Mountain was the loss of Major Cotton's cap, when a gust of wind from Bear Creek Canyon sent it flying down the roadside.

A number of Eastern members hired an automobile one moonlight night and visited the coyote cage in the Denver City Park, thinking that a few yelps of the coyotes would make their Western trip more realistic. Report has it that notwithstanding much coaxing, the coyotes refused to comply.

During the homeward trip from the grave of "Buffalo Bill" the trained eye of Dr. Edmund W. Weber, of Utah, enabled him to locate a drove of elk browsing on the side of Bear Mountain, a half mile or more away.

Commissioner John M. Whittlesey, of Connecticut, was one of the most interested delegates at the convention. Much of his spare time was devoted to the study of the agricultural conditions in the vicinity of Denver, including garbage feeding, hog ranches, purebred cattle farms, certified milk dairies, and chicken ranches.

Unfortunately, in the absence of its chairman, Dr. E. H. Shepard, there was no meeting of the Practitioners' Club, which was organized at the Columbus Convention last year.

The only incident that marred the otherwise pleasant journey of the Convention Special, which left Chicago on the night of September 1, was the arrest of two of our fellow members for playing an innocent game of cards in Nebraska on the Sabbath. A "sheriff" suddenly appeared in the Pullman and announced the breaking of the law of the State and proceeded to take the two members to the platform of the car awaiting the stop at the next station. Much pleading and promising were without avail, and the ruse did not become apparent until another veterinarian who happened by and inquired as to the cause of the commotion, recognized the so-called sheriff as Dr. David S. Jaffray, a veterinary practitioner of Chicago.

THE WOMEN'S AUXILIARY TO THE A. V. M. A.

The fifth annual meeting of the Women's Auxiliary to the A. V. M. A. was held in the Magnolia Room of the Albany Hotel in Denver, Tuesday, September 6, 1921.

The President, Mrs. A. T. Kinsley, Kansas City, Mo., presided. A short, interesting program was given, the main features being the President's address and a paper by Mrs. J. P. Turner of Washington, D. C., telling of the assistance the Auxiliary funds had given in that city.

A telegram of good wishes for a successful meeting from the former President, Mrs. W. H. Hoskins, was read.

The new members were accepted before the business meeting.

A revised constitution was presented and accepted, with minor changes. This incorporates in the object of the Auxiliary (Article II) a loan fund for needy veterinary students as well as financial assistance to veterinarians or their families.

The report of the Loan Fund Committee was read and proposition No. 1 was adopted with minor changes, so that, beginning July 1, 1922, the Auxiliary offers to lend to a senior in attendance at one of the recognized veterinary schools in the United States or Canada a sum not to exceed \$350 at 4 per cent interest, subject to the conditions suggested by the committee.

A telegram of sympathy in her recent bereavement was sent to the ex-President, Mrs. W. H. Hoskins, and the following resolutions were adopted:

Whereas, God, in His infinite wisdom, has removed from our midst Dr. W. Horace Hoskins, the beloved husband of our most loyal and faithful member, the originator and first president of our Auxiliary; and

Whereas, Dr. Hoskins always showed the keenest interest in the affairs of our Auxiliary and was ready to help with advice and counsel;

Therefore be it Resolved, That we, as members of the Women's Auxiliary to the American Veterinary Medical Association, extend to Mrs. Hoskins our heartfelt sympathy in her grief.

And be it further Resolved, That the Secretary be instructed to send a copy of these resolutions to the bereaved

member, Mrs. W. H. Hoskins, and that these resolutions be spread upon the minutes of this meeting.

MRS. C. E. COTTON, *Chairman*.

MRS. I. A. JOHNSON.

MRS. N. S. MAYO.

As the tenure of office is two years there was no election at this meeting and the Auxiliary was adjourned to meet during the next annual meeting of the A. V. M. A.

MARGUERITE M. LOCKHART, *Secretary*.

A. V. M. A. ELECTION NOTICE

Postal cards for nominations for a member of the Executive Board for District No. 6 will be sent out from the Secretary's office soon. District No. 6 comprises California, Nevada, Utah, Colorado, Kansas, Missouri, Arkansas, Oklahoma, Louisiana, Texas, New Mexico, Arizona, Mexico and Central America.

According to the Constitution and By-Laws, no member can vote who has not paid his dues for the current year.

All members of the A. V. M. A. who live in this district and who have paid their dues will receive both nominating cards and regular ballots.

N. S. MAYO, *Secretary*.

HELP WANTED

At the next meeting of the Executive Board of the A. V. M. A. that will probably be held in Chicago about the first of December, plans will be considered for increasing the membership of the A. V. M. A. The Executive Board will greatly appreciate suggestions from the individual members as to how our membership can best be increased. If you have any suggestions send them to me and they will be presented to the Board.

N. S. MAYO.

DUES ARE DUE

About the middle of August statements for dues were sent to every member together with a program of the annual meeting. Quite a number have not paid their dues for the year 1920-21. If you have not sent a remittance, please do so now. The dues are payable in advance and if they are not paid promptly, it will be necessary to stop your JOURNAL. Please send your dues now to the Secretary.

NEW YORK STATE VETERINARY MEDICAL SOCIETY

THE thirty-first annual meeting of the New York State Veterinary Medical Society was held at the Lafayette Hotel, Buffalo, July 27, 28 and 29. The meeting was called to order by the President, Dr. Wright J. Smith, at 10 a. m. The representative from the Mayor's office who was to give the address of welcome had to leave before the meeting was opened and that feature was deferred until the afternoon session. The entire morning session was used in carrying out the order of business up to the reading of papers.

At the opening of the afternoon session Mr. Sweeney, on behalf of Mayor Buck, gave the address of welcome. Dr. Chas. S. Chase of Bay Shore gave a very fitting response to Mr. Sweeney. Dr. E. Sunderville read a paper for Dr. L. A. Norget on the "Importance of Correct Diagnosis." Dr. Norget was present but just recovering from a very severe attack of tonsilitis he was neither able to read his paper nor take part in the interesting discussion which followed. Dr. P. A. Fish read the next paper. It was entitled "The Spermatie Secretion." Discussion was opened by Dr. W. W. Williams of Springfield, Mass. Dr. W. Reid Blair read an excellent paper on "Hookworm Disease in Dogs." Dr. H. J. Milks led the discussion on this paper.

The annual dinner of the society was held at the Lafayette Hotel. Dr. V. A. Moore gave an instructive and helpful talk on the veterinary profession. Drs. Wills, Hollingworth, Blair, DeVine and Volgenau were called upon for discussion.

These men sustained the interest in the topic and helped to make this part of the program one of the best features of the meeting.

The first session of the second day was given up to papers by Dr. W. W. Williams and Dr. W. L. Williams. The paper by Dr. W. W. Williams was on "Observations upon Reproduction in a Purebred Dairy Herd." The one by Dr. W. L. Williams was on "Observations upon Reproduction in a Purebred Beef Herd." These were interesting and valuable papers and they, with the discussions which followed, took up the whole of the morning session.

The papers of the afternoon were by Dr. J. W. Benner, Dr. W. G. Hollingworth and Dr. C. J. Spencer. The paper by Dr.

Benner was on "Mixed Infection in Swine." The title of the paper by Dr. Hollingworth was "Am I an Asset or Liability?" Dr. C. J. Spencer talked on the subject "A Few Ideas of an Ordinary Practitioner." Dr. Spencer illustrated his talk by several appliances which have been used with success in his own practice. The paper by Dr. Hollingworth was rich in the philosophy of an honorable and successful life in veterinary practice. Its teachings are those toward which every man in the veterinary profession should look.

Dr. D. H. Udall of Ithaca was elected President for the ensuing year; Dr. W. Reid Blair was elected Vice-President; Dr. C. E. Hayden, Ithaca, Secretary-Treasurer, and Dr. H. J. Milks, Ithaca, Librarian. Twenty-four new members were elected during the meeting. There is a steady and substantial growth which marks an increase in the influence of the organization. It was voted to send a telegram of sympathy to Dr. W. Horace Hoskins who, it has since proven, was in his last illness. Resolutions were presented on the death of Dr. D. W. Cochran, Dr. James Law and Dr. W. S. Eggleston. It was voted to hold the next annual meeting at Syracuse some time during the summer of 1922. The invitation was extended by Dr. A. E. Merry on behalf of the Central New York Society.

The local Committee on Arrangements provided a boat ride to Crystal Beach as the entertainment for the evening of the second day. Crystal Beach is one of the most popular amusement places which Buffalo offers. A large number of members and visitors took advantage of the opportunity to visit Crystal Beach and found it an excellent place to have a good time.

During the morning of the third day a visit to the Stock Yards, Dold's Abattoir and the Crandall Sales Stables was made. There was opportunity to see the regular operations in the Dold plant. An instructive exhibit of pathological specimens had been prepared by the staff and there was much interest manifested in it. Lunch in the Dold dining rooms was an enjoyable feature of this visit. In the afternoon a large number of members and visitors took an automobile trip to Niagara Falls. A well-deserved vote of thanks was extended to the members of the local Committee on Arrangements for their splendid and effective work in caring for the meeting.

C. E. HAYDEN, *Secretary.*

WESTERN MICHIGAN ASSOCIATION

The summer meeting of the Western Michigan Veterinary Medical Association was held at Manhattan Beach, Reeds Lake, Grand Rapids, Mich., August 16, about 40 being in attendance. An excellent entertainment program was enjoyed by all present.

New members accepted at this meeting were Drs. B. A. Perry of Hastings and R. C. Rawlings of Caledonia.

O. H. VAN BRUSSEL, *Secretary.*

U. OF P. VETERINARY ALUMNI DINNER

Following the ancient custom of all loyal sons of Old Penn, graduates of the Veterinary School of the University of Pennsylvania never fail to "gather 'round the congenial and festive board" whenever a few of the sons find themselves together.

True to Old Penn tradition every Penn man attending the recent A. V. M. A. meeting, held in Denver, attended the "Pennsylvania dinner" held Tuesday evening, September 6, at the Albany Hotel.

After a very enjoyable repast each man present told what he knew of the activities of the members of his class. Many very interesting reminiscences were indulged in and thoroughly enjoyed by all.

Dr. Chas. E. Cotton of Minneapolis presided, and the following submitted "reports": Dr. John W. Adams, Veterinary School, U. of P.; Dr. John R. Mohler, Washington, D. C.; Dr. T. E. Munce, Harrisburg, Pa.; Dr. H. P. Hoskins, Detroit, Mich.; Dr. H. W. Jakeman, Indianapolis, Ind.; Dr. M. Jacob, Knoxville, Tenn.; Dr. N. L. Townsend, New York City; Dr. Howard H. Custis, La Jara, Colo.; Dr. F. S. Jones, Princeton, N. J.; Dr. C. S. Shore, Lake City, Minn.; Dr. R. M. Staley, Philadelphia, Pa.

Dr. Munce reviewed briefly the report submitted by the Welfare Committee at the June, 1921, meeting of the Alumni Society. He told of the good spirit shown by the alumni body and particularly the Welfare Committee, during their meetings and discussions. Also of the valuable and cordial co-operation received from the faculty of the Veterinary School.

It is believed that the greatest possible good will result from the closer relationship between the school and the alumni body.

The enthusiastic and optimistic note that was evident in the remarks of everyone at this meeting shows that every Penn man is for Penn.

Dr. Adams reviewed the work at the school during the past few years, and told us that the prospects for a larger freshman class are better than they have been, at this season, since prior to the war.

Great satisfaction was expressed that the clinical material presented daily at the free clinic held at the Veterinary School is very abundant and includes practically all domestic animals. The work of the ambulatory clinic, which takes the students to some of the greatest dairy and livestock breeding establishments in the country, was described as one of the best conducted ambulatory clinics in operation. It is under the supervision of Dr. C. J. Marshall, who is giving the students the benefit of his years of practical experience, in conjunction with his course in Veterinary Medicine.

As proof that the present teaching methods and ambulatory clinics are fitting men to enter present day general practice it was recalled that, at the 1920 Alumni Day exercises, all of the clinical work was carried out by senior students, who accomplished the work like seasoned practitioners.

The meeting adjourned with a toast—an exceedingly dry toast—to Old Penn and the continued success of the Veterinary School.

R. M. STALEY, *Secretary*.

GEORGIA VETERINARY ASSOCIATION

The fifteenth annual meeting of the Georgia Veterinary Association held in Macon, Georgia, September 21 and 22, passes into history as one of the most successful meetings ever held by this association. In spite of the fact that financial conditions in the South have been very discouraging during the past year, a larger number of veterinarians were present than have been in any meeting of the past five years.

The meeting, held at the Hotel Lanier, was called to order on the morning of the 21st by President Dr. B. E. Carlisle, of Montezuma, Georgia, and a welcome on behalf of the city of Macon was extended to the association by Roger Miller, Secretary of the Macon Chamber of Commerce. This welcome was responded to by Dr. John I. Handley of Atlanta.

The first session of the meeting was devoted to the discussion of the hog cholera question. The first paper, "Parasitic Infestation in Its Relation to Hog Cholera," given by Dr. Guy T. Cole, U. S. Inspector in charge of meat inspection at Moultrie, Georgia, was a revelation in that it showed that parasitic infestation of hogs causes more condemnation of hog carcasses than all other diseases combined. Thousands of pounds of pork are condemned in the packing plants: and if conditions seen in a small packing house are indicative of the country generally, millions of dollars are lost annually due to the needless harboring of parasites by the hogs on the farm. A motion was made at this time to give this paper as wide publicity as possible through the press of the State.

The next paper, "Intra-peritoneal Injection of Hog Cholera Serum Compared with Other Methods of Injection," by Dr. J. H. Coffman, Assistant State Veterinarian, Atlanta, was a short history of the vaccination of hogs against cholera. This paper brought out the fact that due to the ease of the operation, the absence of abscesses and the readiness with which the serum is absorbed, the intra-peritoneal method of injecting hog cholera serum is far superior to all other methods.

A short review of losses following the serum simultaneous treatment of hogs was given by Dr. D. L. Proctor, Hawkinsville, in his paper "Hog Cholera? If not, What?" Dr. Proctor reported that the herds under discussion had been treated and retreated with serum and virus alone and in conjunction with bacterins and, though the ante-mortem symptoms and post-mortem lesions were those usually found in hog cholera, the disease could not be checked. This paper brought out an abundance of opinions as to the cause of these losses and the real identity of the disease.

"Indications and Contra-indications for the Use of Bacterins" was well handled by Dr. J. I. Ruble of Quitman, who showed, by citing cases in his hog practice, that there are conditions in which bacterins are indicated.

The afternoon session of the first day was given over to the discussion of subjects pertaining to general practice. Dr. G. W. Browning, LaGrange, read a paper on "Some Things We Should Not Do in Canine Practice." He pointed out the fact that care should be taken in administering drugs to puppies, and showed

that simple remedies were often more effective than poisonous drugs. This paper brought out some interesting discussions along the line of canine practice. Following this paper, Dr. T. F. Abercrombie, Secretary of the State Board of Health, Atlanta, gave a report of the work being done by the State Board of Health Laboratory in the control of rabies in Georgia. The figures given by Dr. Abercrombie showed that rabies is on the increase in this State and as a result of this report, a committee was appointed, consisting of Drs. Bahnsen, Americus, and Burkland, Atlanta; Drs. Richardson and Purcells, Athens, and Dr. E. D. King, Jr., Valdosta, to investigate experiments conducted by the Board of Health Laboratory and if results were satisfactory, to recommend to the General Assembly of Georgia at their next meeting, the passage of laws controlling dogs with a view of lessening the occurrence of this disease.

Following the discussion of this report, Dr. John W. Salter, Dawson, gave an interesting paper on the pathology of and the technic of the operation against roaring in horses and mules. Dr. P. W. Hudson, Americus, then related some of his experiences with parturient paresis. This paper brought out a variety of arguments for and against the use of different drugs to be given in connection with the inflation of the udder in treating these cases.

The final paper in this session was given by Dr. E. L. Jarvis of Macon, on the subject of abortion. Dr. Jarvis gave an interesting review of his experiences with this disease in cattle. He considered the use of bacterins very satisfactory in treating herds of cattle infected with contagious abortion. The discussion following this paper was participated in by a number of veterinarians present, and brought out the fact that abortion is present in Georgia, not only among the cattle, but also in herds of hogs.

The evening of the first day was spent around the banquet table. Due to the absence of Dr. M. A. Morris, Dr. Bahnsen acted as toastmaster and a memorable evening was enjoyed by all present.

The morning of the second day was given over to the subjects of municipal meat and milk inspection. Dr. E. D. King, Jr., City Meat and Milk Inspector, Valdosta, in his paper, "Is Public Sentiment a Factor in Establishing Meat and Milk Inspec-

tion?" showed that no public work can be successfully carried out without the backing of the public. In his opinion, the public should be educated as thoroughly in the relation of contaminated and diseased milk and meats to the health of a community as it is in the branches of the common school.

"Why Should a Veterinarian Be in Charge of Municipal Meat and Milk Inspection?" was well handled by Dr. A. G. G. Richardson, Dean of the Veterinary Division, State College of Agriculture, Athens. Dr. Richardson, who for many years was a B. A. I. Inspector, showed that the veterinarian is the only man who can control the sanitation of meats and milk from the farm to the consumer. He also showed that no lay inspector can determine the health and condition of the animal or carcass before its products are offered for public consumption, and that few lay inspectors are qualified as sanitary officers.

Dr. R. K. Roberson, Milk Inspector of Columbus, Georgia, on "Dairy Sanitation," gave the points to be considered in conducting a sanitary dairy and the production of wholesome milk. This paper brought out an interesting discussion.

The afternoon session was to have been a demonstration of the combination test for tuberculosis, but as no reactors were found, this part of the program was substituted for a clinic held in Dr. Jarvis' hospital.

The business session closed the meeting. Dr. A. L. Hirleman, U. S. Veterinary Inspector in charge of cooperative hog cholera and tuberculosis control, Atlanta, was elected President for the coming year, with Dr. A. G. G. Richardson, Athens, Vice-President. Dr. Peter F. Bahnsen, Americus, was unanimously re-elected Secretary-Treasurer. Upon invitation of the Chamber of Commerce and Drs. Eppler and Toliver of Albany, that city was awarded the meeting of the association for the year 1922. It was voted that the next meeting be held between the fifteenth and thirtieth of September.

PETER F. BAHNSEN, *Secretary*.

MISSISSIPPI DELTA VETERINARY ASSOCIATION

The Mississippi Delta Veterinary Association held its regular quarterly meeting in Cleveland, Miss., on September 14, the sessions being held in the Firemen's Hall. The meeting was

called to order at 10 o'clock, with Dr. C. D. Crawford, president of the association, in the chair.

Papers were read and general discussions held on the following subjects: "Periodic Ophthalmia," Dr. S. E. Osborn, of Greenwood; "Black Tongue in Dogs," Dr. Luster, Clarksdale; "Swamp Fever," Dr. Sullivan, Sumner; "Rabies," Miss Goach, of the Bolivar County Health Department; "Hog Cholera," Dr. Fry, Jackson; and "Anthrax," Dr. Norton, of Greenville.

The association has asked the leading laboratories to study the question of a stronger vaccine for anthrax, and a committee of veterinarians reported to the association that the laboratories are now working on a product which will give permanent immunity.

The veterinarians in attendance were: Drs. C. D. Crawford, Rolling Fork, president; Bannester, Greenwood, vice president; E. B. Mount, Cleveland, secretary-treasurer; Fry, Jackson; Nye, Grenada; Clark, Grenada; W. S. Sullivan, Sumner; J. C. Boyce, Tutwiler; C. Stallworth, Drew; Luster, Clarksdale; R. H. Mohlenhoff, Cleveland; Osborne, Greenwood; Norton, Greenville; Berry, Leland; Royal, Hollandale; and Heath, of Grenada.

E. B. MOUNT, *Secretary*.

NEW VETERINARY CLUB ORGANIZED

A meeting of veterinarians of seven Central Pennsylvania counties was held recently at the home of Dr. H. T. McNeal, Sunbury, Pa., and a permanent organization, to be known as the Central Pennsylvania Veterinary Club, was formed. The club, which consists of veterinarians of Northumberland, Columbia, Montour, Snyder, Union, Juniata and Mifflin counties, was organized to form a closer personal and professional relation among the members, as well as for the discussion of subjects pertaining to the profession and otherwise advancing the interests of its members.

The meeting was well attended by veterinarians throughout the district. Dr. H. R. Church, of Harrisburg, deputy State veterinarian, gave an interesting talk. Dr. B. M. Potteiger, of Selinsgrove, was elected secretary. The next meeting will be held at Bloomsburg, and Dr. Wm. Smith, of Stillwater, Columbia County, was named president for that session. Meetings will be held every three months and a president for each meeting will be named from the section in which the meetings are held.

MONTREAL VETERINARY CONVENTION

The Quebec Veterinary Medical Association, officially known under the name of College of Veterinary Surgeons of the Province of Quebec, will hold its annual convention early in November, when a veterinary surgeon officially delegated by the Société de Médecine Pratique, of Paris, France, is expected to be present to perform surgical work and possibly read one or two papers.

Owing to the uncertainty of the date of sailing of the French veterinary surgeon, it has been found impossible to set definitely the date of the convention, which will take place either the latter part of October or the very beginning of November.

Those who have had the good fortune of being present at former conventions will probably give the incredulous look when they read that the forthcoming convention will eclipse anything ever attempted before by the Montrealers, but the officers have the doggy determination which spells success with a capital S, and, since they have never before failed to keep their word, the convention is bound to be heard of favorably later on.

The demonstrations of the intended delegate from France will take the almost if not the altogether exclusive form of surgical work, and many are the names of prominent veterinary surgeons throughout the country who have signified their intention of being present.

The committee wishes to extend a hearty invitation to all veterinary surgeons outside the scope of the association to be present as guests, those of Quebec having already received a circular letter requesting them to attend as active members and asking for their cooperation.

The convention will take place at the Montreal Veterinary College, under the chairmanship of Dr. Albert Dauth, with Dr. J. H. Villeneuve as secretary-treasurer of the Organization Committee, at 266 Craig Street East, Montreal.

J. H. VILLENEUVE, *Secretary*.

THE PARIS VETERINARY CONFERENCE

Belated reports of the Paris conference from several of the French veterinary periodicals indicate that forty-three countries (including dominions, colonies, etc.) were represented by delegates.

Germany was represented by Prof. Robert Ostertag and two others.

Sir Stewart Stockman represented Great Britain and also Canada and was chairman of a committee.

The French delegation of eight included Doctors Calmette, Leclainche, Roux and Vallée.

Sir Arnold Theiler represented South Africa and Dr. W. H. Wray the United States. Prof. Hutyra was there representing Hungary, while Dr. DeJong was the delegate from the Netherlands.

Every country in Europe except Russia and Turkey seems to have been represented; also Brazil, Chile, Paraguay, Peru, Australia, New Zealand and Japan.

The president of the conference was a French Senator, Massé. The details of this conference will be found in the October, 1921, JOURNAL.

THE FIRST WORLD'S POULTRY CONGRESS

The first World's Poultry Congress was held at The Hague, Holland, September 5 to 15, 1921, Queen Wilhelmina and the Prince Consort opening the Congress. The work was divided into two parts, viz., that of papers, and that of an exhibition.

Of interest to veterinarians was the exhibition, which comprised a collection of pathological specimens of fowls, nicely mounted and staged by the State Serum Institute of Rotterdam, including specimens of tuberculosis, roup, diphtheric enteritis, parasites, etc. The other section on disease was by the Poultry Pathology Research Laboratory of the North Carolina Experiment Station and included enlarged photographs, photomicrographs and prepared specimens of tumors of fowls and black-head of turkeys, etc.

The program of papers was divided into sections, the third being that of Hygiene and Disease, which was presided over by Dr. D. A. De Jong of the State University of Leyden. Twelve papers were presented in this section by veterinarians who have specialized in diseases of poultry. Among the contributors were Prof. Dr. J. Poels, Professor Dechambre, Dr. D. A. De Jong, Dr. B. F. Kaupp, Prof. Dr. L. Le Blieck, Dr. J. R. Beach, Dr. F. Van Heelsbergen, Dr. B. J. C. Te Hennepe, Dr. H. Van

Straaten, Dr. H. E. Reeser, Dr. L. F. Rettger and Prof. Dr. Camillo Terni.

Among the resolutions passed two are of especial interest to the veterinarian:

1. In all countries where poultry production is an important industry, that adequate courses be provided in the teaching of poultry diseases in all veterinary and agricultural colleges.

2. In all countries where poultry production is an important industry, that investigation of diseases of poultry be continued and a study of the advisability of official control of outbreaks of contagious and infectious diseases among poultry be made, and in the event of the advisability of such control, to determine which of the contagious diseases should be so controlled.

One of the excursion trips was to Rotterdam to visit the State Serum Institute. This institute conducts studies of diseases of the domestic animals of Holland, including poultry. It also maintains a laboratory for the examination of milk and water. It produces the sera and vaccines used in Holland for both prophylactic and curative measures in combating diseases of livestock and poultry. In this part of the institution there are kept 150 horses, 60 cattle and 200 hogs. The sera used on cattle are made from hyperimmunized cattle. It was found that some cattle suffered "serum disease" when sera from horses were used. The sera used in combating diseases of poultry included one for fowl cholera and one for fowl typhoid.

B. F. KAUPP.

TUBERCULOSIS ERADICATION CONFERENCE

The Tuberculosis Eradication Conference, which will be held in Chicago, November 25 and 26, 1921, promises to be the most important meeting of its kind ever held in the United States. The program which appears below contains the names of many of the best authorities in their respective lines in the United States. Every person assigned to the program has a close connection with the tuberculosis eradication problem either from the human or livestock side. If there is not sufficient time to discuss all of the subjects thoroughly during the two days of the conference, it will be extended over another day. A feature of this year's conference will be the attendance of the field inspectors—county, State and Federal—assigned to work in the States

adjacent to Illinois. Every veterinarian, livestock owner or other interested persons who can arrange to attend the conference will be made welcome. The sessions will be held in the Red Room of the La Salle Hotel, Chicago, Illinois. The program follows:

NOVEMBER 25.

10. a. m.	Address of Welcome.....	Hon. B. M. Davison.
10.30 a. m.	Object of Conference.....	Dr. John R. Mohler.
11.00 a. m.	The Work of the Bureau Experiment Station on Tuberculosis.....	Dr. E. C. Schroeder.
11.30 a. m.	Relation of Bovine Tuberculosis to Human Health	Dr. W. A. Evans.
1.30 p. m.	Obscure Lesions in Bovine Tuberculosis	Dr. L. Enos Day.
2.00 p. m.	Clinical Studies Relative to Tuberculosis of Children	Dr. Isaac Abt.
2.30 p. m.	Progress of Tuberculosis Eradication in Vermont	Hon. E. S. Brigham.
3.00 p. m.	The Farm Bureau and Tuberculosis	Hon. James Howard.
3.30 p. m.	The Eradication of Tuberculosis from a Purebred Herd of Cattle.....	Mr. James Brown.
4.00 p. m.	The Specifications Under Which the Intradermic Test Should Be Made.....	Dr. C. E. Corwin.

Discussion.

NOVEMBER 26.

9.00 a. m.	Turning Back Accredited Herds to Approved Veterinarians	Dr. J. G. Ferneyhough.
9.30 a. m.	The Economic Importance of Eradicating Tuberculosis	Mr. Thomas Wilson.
10.00 a. m.	The National Live Stock Exchange and Its Interest in Eradicating Tuberculosis	Mr. Everett C. Brown.
10.30 a. m.	The County Agent's Place in the Tuberculosis Eradication Campaign	Mr. H. E. McCartney.
11.00 a. m.	The Editor and the Breeder.....	Mr. A. J. Glover.
11.30 a. m.	The Advantages of an Accredited Herd	Mr. L. A. Campbell.
1.00 p. m.	The Eradication Campaign in Missouri	Dr. D. F. Luckey.
1.30 p. m.	The Combination Tuberculin Test Method	Dr. L. B. Ernest.
2.00 p. m.	Report of U. S. L. S. S. A. Committee on Tuberculosis	Dr. T. E. Munce.
2.30 p. m.	The Practicing Veterinarian in Accredited Herd Work	Dr. J. G. Townsend.
3.00 p. m.	The Eradication of Tuberculosis from Areas	Dr. T. S. Rich.
3.30 p. m.	The Eradication of Tuberculosis in Minnesota	Dr. C. E. Cotton.
4.00 p. m.	Report of Committee on Tuberculosis Free Areas	Dr. M. Jacob.

Discussion.

COMMUNICATIONS

"WATCH OUT FOR DR. J. HANAGAN"

TO THE EDITOR:

Letters on file in this office carry the information that one "Dr. J. Hanagan" was "located" in Harlowton, Montana, during the month of August, 1921, that he pretended to have "just returned from the U. S. Army," was a graduate veterinarian, and expected to follow the practice of the profession at Harlowton.

Through the pretenses above mentioned, Hanagan secured the instruments of the late Dr. A. H. Mehn, from his widow, giving a note without security. Hanagan also borrowed some money from a druggist in Harlowton "to make the trip to Helena to get his veterinary license."

Hanagan took the veterinary instruments he secured from Mrs. Mehn and has failed to return to Harlowton, and has never made application for a veterinary license.

I solicit your cooperation and request that you report any information you may have of "Dr. J. Hanagan" to this office, and also to Dr. W. J. Butler, Helena, and Mr. H. C. Hawley, Harlowton.

A. D. KNOWLES,

Secretary, Montana Board of Veterinary Medical Examiners.

POST-CARD ADVERTISING BY VETERINARY SUPPLY HOUSES

TO THE EDITOR:

I wish to bring to your attention the habit which seemingly is growing with the supply houses of sending out post cards advertising their products, prices, etc., to the public eye as well as to the veterinarian addressed.

Today I have just received such a card. No doubt many of my brother practitioners have received similar cards. Veterinarians, let's get together on this thing and stop it while still a young practice. It is easy to do. When any firm sends you a post card, simply return it to them with a letter notifying them you will stop using their products if they can not send your mail more privately. And we shall soon see if that firm is willing to sell only to the graduate or if such firm wants to

sell to the public, and is so aiming to double-cross us, with the post-card scheme of broadcasting the prices of their products. Stand by the firms that stand by you. If the majority of us will not tolerate such a cheap way of doing business as to send mail regarding prices of products, etc., on post cards, we can soon put a stop to it, and so uphold our professional interests. Brother practitioners, it's your turn now—Act.

Greensboro, N. C.

G. S. GLOVER.

LETTER FROM ECUADOR

TO THE EDITOR:

As you doubtless know, in countries like these stock is very seldom treated, or if so in a very routine manner. This is due to ignorance, the manner in which stock raising is carried on, and the low value of most of the animals. I may say that this is especially true of Ecuador. Of all the South American countries this is, in my opinion, the most backward in stock raising, and added to that the people really refuse to learn anything new. I am the only graduate veterinarian in the country, and if I had to depend on practice I guess I would starve to death. I do a little private practice on race horses and dogs when I am not engaged on the haciendas. As yet we have not our Animal Industry Department in shape, and I do not know if we ever will have any animals or laboratory which are very much needed. However, we are going ahead slowly, and if allowed to continue I yet have hopes of making a success of it. But everything here advances very slowly.

It may be of interest to you to know, if you do not know already, that we now have foot-and-mouth disease in Ecuador for the first time. This was introduced May 2 by some Shorthorn bulls imported from Chile. These cattle arrived sick, but since there is no veterinary examination or quarantine, the port medical officer passed them. They were shipped directly to the Sierra near Quito, where the owner called in the municipal veterinarian, who diagnosed the disease as acute rheumatism and not contagious. Very soon over a thousand head were sick, and it spread to other haciendas, so that when the President finally called on me to investigate this disease there were some 20 haciendas and about 5,000 head or over sick. I diagnosed it as foot-and-mouth, and tried to show the authorities how to com-

bat it by quarantines, but with poor success, for as soon as I had diagnosed it everyone became a veterinarian and my services were no longer needed. As a result it has spread over a good part of the country and has gotten down here on the Coast. There are still many haciendas infected, and it is continuing to spread. There are no animal sanitary laws, inspectors, or help of any kind. The most of the hacendados will not cooperate or take the disease seriously on account of the low mortality, and decreased production means nothing to the most of them. The Government has no money and will give no help, so I do not see how we can make much progress in eradicating the disease under the existing conditions. It is, however, in a very mild form, and the mortality is next to nothing, even in the calves. But on some ranches the loss in milk production, after recovery of the cows, is 20 per cent. Here on the coast where all the cattle are "criollo" the disease is even more benign than in the Sierra where there are a lot of grade Holsteins and some Short-horns.

Other diseases that cause losses among calves are traumatic gastritis caused by hair balls, broncho-pneumonia, and pyo-septicemia of sucklings. This latter disease I believe is responsible for many of the deaths among calves, although in many cases the symptoms are very vague. But the umbilicus of most of the calves born becomes infected. In fact, it is the custom to allow this to become infested with screw worms for eight days, after which it is cleaned out, the worms killed with creolin and then the wound packed with dry manure. In only a very few cases have I seen the articular form, but in many postmortems on calves which had been consistently "bad doers," I have found large abscesses in the liver, others in the lungs, and many times a bronchial pneumonia, and I believe the infection enters through the navel cord. In regard to vaccines, the only ones used here are for blackleg. The use of other biologics is not known here or is not permissible because of their cost. There should be a big demand for hog-cholera serum, as every year probably 60 to 70 per cent of the hogs die of cholera, and it is impossible to raise hogs on any scale. Yet I have not persuaded anybody to vaccinate, although the price of pigs is relatively high, so that it would pay if the serum could be imported, and I suppose it could be if kept on ice during the trip.

In addition to my position with this cattle company, I have

been appointed Inspector General, Sanidad Veterinaria del Litoral, by the Government, but I am sorry to say I don't believe we can accomplish much at the present time in control of diseases, because of lack of cooperation, but we have a start anyway, if only a very weak one. EUGENE FERRON.

Guayaquil, Ecuador.

MOVE TO ASSIST HORSE BREEDING

A movement is on foot to encourage horse racing in every State in the Union in order to insure the United States of improved breeds of Thoroughbred horses and thus open to this country a horse market which will successfully compete with England and Ireland, which for 200 years have been the horse markets of the world.

Thomas Clyde, Maryland horse breeder and patron of horses, agrees with the Horse Association of America, in its stand for the breeding of fine Thoroughbred horses in this country.

"The United States is immeasurably behind European countries in the matter of horse breeding," Mr. Clyde stated recently. "In Germany and in Austria-Hungary it was found necessary many years ago to assist private breeders by various methods to which the state contributed. In Russia in 1772, government studs and horse races were established with a view to improving the breed.

"France before the war had an interesting system of government horse breeding. Two or three times a year a commission appointed by the ministry of agriculture invited owners to bring their best horses to the various depots for inspection. Good racing records being essential, inspectors, with all particulars and performances on hand, made selections for size, soundness and looks. The offers were then made to the owners of the selected horses which could be accepted or refused. Such horses when bought were sent to one of the government depots for breeding purposes. English racing is the backbone of English horse breeding. The armies of central Europe were horsed by England. One of the most valuable pieces of property an Englishman can own is a popular and successful Thoroughbred stallion."—*Chicago Tribune*.

NECROLOGY

Hon. W. C. Edwards, Senator in the Canadian Parliament and former member of the International Commission on Tuberculosis of the A. V. M. A., died September 17, in his seventy-eighth year. At the meeting of our association at Ottawa in 1903 Senator Edwards entertained those present for an entire day by taking them to his estate at Rockland on his steamer *Empress*. He provided a band, a luncheon and supper as well as a horse show of his Hackneys in his private pavillion. The ladies were given tallyho rides about the country in the morning and when the music started in the afternoon he began the ceremonies by dancing the Highland Fling himself. One session of this memorable meeting was held on his farm for the discussion of tuberculosis, as his individual herd of valuable Shorthorns was under the Bang system. Six years later the International Tuberculosis Commission met at Ottawa and after the business sessions were concluded the Senator again entertained the members at his home in Rockland in true Canadian fashion.

The passing of Senator Edwards removes not only one of the outstanding personalities in Canada, but a staunch and ardent friend of the veterinary profession.

SALMON MEMORIAL FUND GETS BEQUEST

The will of Dr. W. Horace Hoskins, dean of the New York State Veterinary College, of New York University, bequeaths \$100 to the veterinary school "as a suggestive testimonial of my indebtedness to the veterinary school that afforded me a life work of usefulness and service and that brought me richer results and pleasures than money."

A similar sum is bequeathed the Salmon Memorial Fund "as a tribute to one of the most complete lives of unselfishness and true public service ever lived by any member of my chosen profession."

The Country Gentleman contains a feature article entitled "Pedigrees and Pork," showing that purebred stock pays at the trough. It concludes with the statement "the purebred hog makes pork most economical and this is the big factor breeders must teach and prove and sell."

MISCELLANEOUS

HONOR FAMOUS MORGAN HORSE

Justin Morgan, progenitor of the famous breed of Morgan horses, which made farm animal history during the last century, was honored on the centenary of his death, October 1, as very few horses ever have been honored. A statue of a representative Morgan horse was presented to the United States Department of Agriculture at the department's Morgan horse farm, Middlebury, Vt., by the Morgan Horse Club.

The statue, which cost \$18,000, is by Frederick G. R. Roth, of Englewood, N. J., one of the foremost animal sculptors of the world. It is of bronze, one-fourth oversize, and stands on a pedestal of Vermont granite in front of the barn of the breeding farm, near the top of a beautiful sloping lawn, about 250 yards from the highway and 50 yards from the circular driveway of the grounds.

To get the type correctly, Mr. Roth studied all the literature of the breed, examined old prints, inspected modern representatives of the type, and interviewed dozens of American Morgan horse breeders. It is expected that the statue will stand as a permanent standard of the breed.

The presentation speech was made by E. A. Darling, of East Burke, Vt., president of the Morgan Horse Club, and the statue was accepted by Dr. John R. Mohler, Chief of the Bureau of Animal Industry. It was unveiled by Miss Elizabeth G. Stillman, daughter of C. C. Stillman, of New York, secretary of the club.

Justin Morgan, founder of the famous family, was the property of a Vermont breeder by that name, and was foaled in 1789. He was by True Briton, by Imported Traveler by Morton's Traveler, which traces in near and direct lines to Arab stock. From the line descended a number of famous trotters of the last century, but the popularity of the family was based chiefly on the endurance, beauty, and style of its members.

In recent years the race became scattered and nearly extinct, but has been largely restored to its original form through the efforts of the Department of Agriculture.

In accepting the statue, Dr. Mohler said:

“Members of the Morgan Horse Club and friends:

“Few horses have been honored as the horse which stands on this pedestal has been honored. Nor is it a transient impulse that has led to this beautiful tribute. Within the span of a hundred years many things are forgotten. Human life and human memory are necessarily crowded with events that demand thought and attention. Yet here in bronze is a creature whose service to mankind has won for him human esteem that has continued through a century. It was an esteem so sincere that intervening generations have accepted it, nourished it, and passed it on to us as an inheritance.



Bronze Statue of Justin Morgan

“In this statue of Justin Morgan, progenitor of the breed that bears his name, we have the expression of a glowing zeal, a desire to go on, to build, and to beautify. The sculptor’s art has given us a Justin Morgan of enduring bronze. But there is also another Justin Morgan, a horse of flesh and bone and blood. In a material sense, and from a lay standpoint, that

horse died a century ago. But as horse lovers and breeders of living creatures you know that the great sire whom we honor today still lives wherever Morgan horses are bred.

"Definite purpose, vision, cooperation, and skill—these attributes combined in a permanent organization like the Morgan Horse Club virtually guarantee the immortality of its notable sires and dams as expressed through their progeny.

"Within the century that has just passed our national development has been unusually rapid in engineering, mechanics, and related sciences. This has been true chiefly because engineering has been the life study and life work of thousands and thousands of persons. Opportunities were plentiful, the field was large, and the results attained were inevitable. Our private and public works, inventions, and industrial prominence in world affairs are ample evidence.

"Yet, judged in the light of true public service, which is the final test of an achievement, the work of developing a fine type of live stock is fully as noteworthy as that of completing a fine piece of engineering.

"Human aims and preferences, of course, are diverse, for which let us be thankful. It means more fruits of life to enjoy, even though we have not personally grown them. Besides, it leaves a wider range for initiative in whatever field anyone selects for his own work. But what satisfaction can any man or woman enjoy that surpasses the development and perfection of useful living creatures, embodying beauty, grace, and strength?

"The work of a breeder has a scope which overflows the limits of ordinary professions. Members of the Morgan Horse Club are at once engineers in combining weight, speed, and balance; sculptors in molding future form, conformation, and style; historians in the study of traditions and records; and finally, philanthropists in presenting the statue of Justin Morgan, which many may study and enjoy. In behalf of the United States Department of Agriculture, I receive this beautiful tribute and gift. Though you have presented it to the department, I am confident that you desire the public to share in the benefits which it is capable of giving. The department, therefore, will be its custodian, faithful to the trust which you have shown. But just as Morgan blood has permeated the horse stock of the country, so let us be liberal in extending the educational influence

of this horse of bronze. It is here for visitors to see, to study, and to enjoy. It is here also for the artist to paint and the camera to reproduce for the benefit of those who cannot come to this spot. Members of the Morgan Horse Club, I accept your generous gift and confidently hope that the Justin Morgan of bronze may ably supplement the achievements of the other Justin Morgan who lived a century ago."

Dr. B. F. Kaupp, Professor of Poultry Diseases at the North Carolina Agricultural College, has just returned from the World's Poultry Congress, held at The Hague. There were 450 delegates present from 25 countries, and all present pronounced the congress a grand success.

The Ohio State Veterinary Medical Association will hold its next annual meeting in the Hotel Deschler, Columbus, Ohio, on February 2 and 3, 1922. An attendance of 350 is anticipated, the February dates having been selected to avoid conflict with the many meetings held in January by the different State associations.

An outbreak of blackleg is reported by Dr. W. C. Sprinkly on a farm near Oakland City, Gibson County, Ind.—*Indiana Farmer's Guide*.

For the first time in several years it is reported that cattle again are being poisoned by larkspur in Oregon.—*Portland Oregonian*.

Dr. C. P. Dixon of Charlottesville, Virginia, is spending his well-earned vacation of a few months in England.

Dr. A. H. Logan has been transferred from Federal hog cholera work in Kentucky to the same project in Florida.

Dr. G. J. Lingerich has gone from hog cholera work of the Bureau of Animal Industry in Iowa to meat inspection duties at Chicago, Ill.

Dr. A. C. Drach has severed his connection with the Bureau of Animal Industry and is now engaged in the production and sale of anti-hog-cholera serum.

Dr. E. I. Smith has been placed in charge of the Government work of tuberculosis eradication and hog cholera control in Tennessee with headquarters at Nashville.

Dr. Lynn H. Tripp and Dr. Dennis S. Shannon have been transferred from Federal meat inspection at Boston to tuberculosis eradication in Vermont.

Dr. James B. Way, who has been engaged in field inspection duties on the force of the Bureau of Animal Industry at Fort Worth, Texas, has been transferred to tuberculosis eradication in Kentucky.

A flivver must be mighty disgusting to a horsefly.—*Detroit Journal*.

The second session of the International Research Council will be held at Brussels, Belgium, beginning July 22, 1922, according to an announcement by the Secretary General, A. Schuster.

Two veterinarians are included in the commission to be entrusted with the task of elaborating the new Spanish Pharmacopœia. It is composed, in addition, of four physicians and four pharmacists. All are members of the Academy.

An extended review of horse-raising in the United States and Canada, by Prof. H. Zwaenenpoel, of the Belgian Veterinary School, appeared in the *Annales de Médecine Vétérinaire* for April, 1921. Among other observations he remarks that the feet of horses are not well cared for in America. He considers horse-shoeing very backward here. Because of the insufficient number of horseshoers and the great distances, he says, farmers sometimes shoe their own horses and use improper shoes. He observed that a great many horses go unshod and that the trimming of their hoofs is neglected, with the result that the hoof spreads and splinters, causing injury to the heels. He also found much to commend in American horses.

JOURNAL

OF THE

American Veterinary Medical Association

FORMERLY AMERICAN VETERINARY REVIEW

(Original Official Organ U. S. Vet. Med. Ass'n.)

J. R. MOHLER, Editor, Washington, D. C.

A. T. KINSLEY, President, Kansas City, Mo. N. S. MAYO, Secretary, Chicago, Ill.
M. JACOB, Treasurer, Knoxville, Tenn.

Executive Board

GEO. HILTON, 1st District; T. E. MUNCE, 2nd District; S. E. BENNETT, 3rd District;
J. A. KIERNAN, 4th District; C. E. COTTON, 5th District; R. A.
ARCHIBALD, 6th District; CASSIUS WAY, Member at Large

Sub-Committee on Journal

S. E. BENNETT J. A. KIERNAN

The American Veterinary Medical Association is not responsible for views or statements published in the JOURNAL, outside of its own authorized actions.

Reprints should be ordered in advance. Prices will be sent upon application.

VOL. LX, N. S. VOL. 13

DECEMBER, 1921

No. 3

THE VETERINARIAN AND ANIMAL EXPERIMENTATION

AT THE Denver meeting of the American Veterinary Medical Association, a resolution urging the necessity and desirability of animal experimentation was unanimously adopted. This action of the Association accurately reflects the sentiment of the veterinary profession, as veterinarians are thoroughly familiar with the benefits of such experimentation and the advantages accruing to their patients from the research work carried out on ownerless dogs and cats and on horses which have outlived their usefulness. There is no question in our profession as to whether it is better to use these animals to add to our knowledge and our ability to save our clients' animal friends and servants or to kill these useless animals and lose the knowledge and proficiency that we might derive from their use in experiments. Non-medical men and a very small minority of medical men may argue that the knowledge derived from animal experimentation can not be applied in the field of human medicine; veterinarians know that such knowledge is immediately applicable to animal patients in much greater numbers and of far more value from a sentimental or economic standpoint than the animals used in the experiments.

But it is not sufficient that the veterinarian should know this. He should also know that attacks on such experiments are constantly being made by persons with little or no accurate knowledge of animal experimentation. The aim of such persons is usually to put animal experimentation on a basis of regulation under the direction and supervision of individuals untrained in science, to follow this entering wedge by prohibiting the use of dogs in such experiments, and finally to prohibit entirely all animal experimentation. Propaganda toward this end is being constantly carried on in this country and other countries. In England hampering regulations have been enacted to the detriment of biological research. In this country regulation has several times been introduced into Congress and some of the State Legislatures. Such regulatory legislation was before Congress last year and was defeated. It was before the California Legislature last year and was defeated on a referendum to the people. It will doubtless be introduced in several places this year and it is essential that the veterinarian take his share in repelling attacks of this sort on research. He is as well informed as persons in any profession or occupation in regard to the desirability of continued experimental research, and better informed than most persons. He realizes, as most persons can not, that individuals without scientific medical or veterinary training are as incompetent to judge the necessity for animal experimentation and the mode of conducting it as persons untrained in chemistry are to supervise chemical research or persons untrained in law are to pass on nice legal distinctions.

Since the veterinarian is the one most competent to supervise such research along veterinary lines, it is important that he exercise this supervision to its full extent and that he take all steps necessary to show that it is being exercised wisely. We are well aware that animals in veterinary colleges and laboratories are handled in a kindly manner and with consideration for their well-being and comfort. But we should emphasize the need for such consideration in dealing with students and place ourselves on record before the world at large in our laboratories and colleges in regard to our attitude in this matter. To this end there is posted in many medical schools and laboratories a set of regulations in regard to handling animals, and these regulations serve as a constant reminder to the student and also afford visible evidence to the public of the nature of the supervision which

we exercise over our animals. A set of regulations, somewhat modified from the medical regulations, is posted in the animal room of the Bureau of Animal Industry and in the Bureau laboratories where animal experiments are conducted. We strongly urge that the other veterinary laboratories and the veterinary colleges keep these rules or a similar set conspicuously posted, regardless of the fact that their present practice is already in accord with them. These regulations are as follows:

“Experiments on animals will be carried on in the Bureau of Animal Industry subject to the following set of rules, copies of which will be kept posted in the animal room and in all laboratories of this Bureau where such experiments are conducted:

“I. Dogs and cats intended for use as experiment animals shall only be purchased or accepted from the city pound of Washington or pounds of other cities or from the owners of the animals when satisfactory proof of the legal right of such persons to dispose of such animals is shown.

“II. Animals in the laboratory shall receive every consideration for their bodily comfort; they shall be treated kindly, fed properly, and their surroundings kept in the best possible sanitary condition.

“III. No experiments on animals shall be made except with the sanction of the Chief of this Bureau or the Chief of the Division in which the experiment is carried on, the one approving the experiment to hold himself responsible for the importance of the experiment and the propriety of the experimental procedure.

“IV. In any operation likely to cause greater discomfort than that attending anesthetization, the animal shall first be rendered incapable of feeling pain and shall be maintained in that condition until the operation is ended.

“Exceptions to this rule may be made by the Chief of Bureau or the Chief of the Division in which the experiment is carried on, but only when anesthesia would defeat the object of the experiment. In such cases an anesthetic shall be used so far as possible and may be discontinued only so long as is absolutely essential for the necessary observations.

“V. At the conclusion of the experiment the animal shall be killed painlessly.

“Exceptions to this rule will be made only when continuance of the animal's life is necessary to determine the result of the

experiment. In that case, the same aseptic precautions shall be observed during the operation and the same care shall be taken to minimize discomforts during the convalescence as in a hospital for human beings."

ANTIVIVISECTION ANTICS

AN ARTICLE on "The Truth About Vivisection" by Ernest Harold Baynes in *The Woman's Home Companion* has aroused the ire of the antivivisectionists and has provoked a characteristic exhibition of their methods. Mr. Baynes, who is a leading naturalist and animal lover, after a long and painstaking investigation concluded that the whole case of the antivivisectionists is without any sound basis of fact, and showed that their literature is a tissue of misrepresentations and garbled and obsolete authorities. He found, for instance, that one Dr. John Elliotson, quoted by them as a physician "of the highest intelligence," was a mesmerist, born 130 years ago.

Instead of attempting to reply squarely to the very definite statements made in Mr. Baynes' article, the New York Antivivisection Society has issued a circular letter "to all friends of animals" calling on them to write to the *Companion* "excoriating this nonsensical article" and "telling the editors that not only have you bought your last number, but that you will enter upon a personal campaign to urge others to withdraw all support in future."

Evidently the antis do not relish having their methods shown up. It is more in line with their principles to abuse the author and boycott the offending journal than to controvert the article by fair argument and statements of fact. The inference is plain that they are unable to do the latter.

ANNUAL MEETINGS AND THE PRESS

ONE OF the most powerful and immediate acting educational forces of the Nation is the Associated Press. It does more to mold public opinion and shape the destiny of a people, or an organization, than all the combined orators and reformers who ever graced a platform.

If we did not have the advantages of the Associated Press, we would be clamoring for a substitute. Now that it is a tangi-

ble resource and instantly spreads information to the reading public, it is difficult to understand how the A. V. M. A. can indulge in so much enthusiasm and neglect so great an opportunity.

When the meeting was held in New Orleans in 1919, the membership commenced to realize the necessity of a closer and more accurate relationship with the Press, and to a certain extent our ambitions were realized, but we had to be content with a small amount of space, because the paper shortage was at its peak. How the publicity division of the Association has fared since the New Orleans meeting we are unable to discuss, but it is a known fact that the proceedings of the A. V. M. A. are never featured outside of the city where the conventions are being held.

We are climbing the grade toward a goal which we have placed at the very crest; we are striving to show the world the merits of veterinary medicine and the mettle of our personnel, whereby our cause may receive due recognition and, when necessary, be heroically championed in the halls of Congress and the legislative chambers of the States. We will be precluded from accomplishing all of this until better and closer co-operation is established between the profession and the Associated Press.

It is sincerely hoped that when the President of the A. V. M. A. delivers his address either at St. Louis, Missouri, or Madison, Wisconsin, he will incorporate within that manuscript a recommendation for the appointment each year of a publicity committee which will endeavor to eliminate undesirable headlines and furnish sound, sensible and accurate basic material consistent with the dignity of the profession, so that when the convention has closed our achievements and ambitions will have been properly disseminated to the great mass of humanity whom we are serving.

E. I. S.

A REMINDER OF THE REAL DANGER OF RABIES

THE well-informed medical man—physician or veterinarian—knows perfectly well that rabies or hydrophobia is a real malady caused by a specific virus and usually transmitted by the bite of an affected dog or other animal. For many years scientific research has left no room for skepticism on this point.

Some doubt still persists among the laity, however, and this is sedulously cultivated by zealous antivivisectionists whose opposition to animal experimentation will not permit them to acknowledge facts developed in that field of research. This skepticism also finds favor with persons who oppose the muzzling of dogs. It is well, therefore, for veterinarians to be posted and to aid in the spread of correct information on the subject of rabies. In recent years the Pasteur treatment has been so generally employed on bitten persons that authentic cases of death from rabies have become relatively rare and the malady has lost some of its terror for the popular mind.

A convincing case of fatal rabies in man in the French African colony of Senegal was recently reported by Teppaz in the *Recueil de Médecine Vétérinaire* (vol. 97, p. 207). Because the disease was practically unknown there, the idea of its non-existence gained credence among the European population, while the natives were ignorant of any danger. At length a few cases, probably of European origin, were detected in dogs, and a Government veterinarian called attention to the danger and tried to enforce sanitary measures, but his efforts met with disbelief and opposition.

In August, 1920, a European suffering with spasm of the larynx and esophagus was received at a hospital. In a few hours he died in a terrible attack of asphyxia. It developed that he had been bitten on the hand and knee by a stray dog six weeks before. The same dog also bit a dog belonging to him, and the latter dog developed blindness and partial paralysis and was destroyed. The man twice expressed his intention of going to the hospital for antirabic treatment, but each time he was dissuaded by those who argued that rabies was not a reality and that no one had ever seen a case in a European in Senegal. Rabies in the patient was demonstrated clinically, and also experimentally by inoculation of rabbits and guinea-pigs.

Wisconsin Farmer says editorially: "The purebred-sire campaign that is being waged all over the country should be continued with greater vigor than ever, because the present is the most opportune time for men with small herds of beef or dairy cattle or hogs to buy registered sires."

THE TYPES OF *BACILLUS BOVISEPTICUS* ENCOUNTERED IN A DAIRY HERD¹

By F. S. JONES

Department of Animal Pathology, The Rockefeller Institute for Medical Research, Princeton, New Jersey

DURING the past four years a large dairy herd has been under observation by members of the staff of the Department of Animal Pathology of The Rockefeller Institute for Medical Research. Within this time many autopsies have been made on cows and calves. In the later months of 1920 a serious outbreak of pneumonia (1) occurred among cows purchased a short time before. The disease spread to another lot of newly acquired cows and to a few of the native stock. After the outbreak subsided a few sporadic cases appeared in the herd and among the calves. It is of interest to observe that following this outbreak the lungs of a number of cows slaughtered for various reasons showed lesions of chronic pneumonia and purulent bronchiectasis.

The organisms isolated from the acute outbreak in the cows and the sporadic cases in the adults and calves were identical. Although the pneumonia associated with these infections was severe, the virus was confined to the lungs and pleural cavity. Blood cultures during life and inoculations from the kidney and spleen at autopsy remained sterile. It was possible to obtain *Bacillus bovisepiticus* in pure cultures from the lungs in every instance. Morphologically these organisms resembled the strains of *B. bovisepiticus* isolated by T. Smith (2) in his studies on calf pneumonia associated with *B. actinoides*. When the complete cultural characters of these two sets of organisms were studied clear-cut differences were noted. Two other cultures in addition to the organisms isolated during the outbreak and from the sporadic cases and those obtained by T. Smith are included in this study. In Table 1 the source of each culture is given. They are arranged in the table according to their cultural grouping, which will be brought out later.

From Table 1 it will be noted that strains 530, 533 and 537 were obtained in pure culture from the lungs and pleural cavi-

¹ Presented at the fifty-eighth annual meeting of the American Veterinary Medical Association, Denver, Colo., September 5-9, 1921.

TABLE 1.—THE SOURCE OF THE STRAINS STUDIED.

Strain number	Date of isolation	Source	Type of disease encountered	Organisms other than <i>B. bovis-septicus</i> .
530	Nov. 12, 1920	Outbreak among cows on near-by farm (A).	Diffuse pneumonia, virus localized within lungs and chest cavity.	None.
533	Nov. 14, 1920			
537	Nov. 19, 1920			
550	Dec. 19, 1920	A calf at close of epidemic on Farm A.	Nodular, necrotic pneumonia.	<i>Staph. albus</i> .
562	Jan. 26, 1921	Calf, apparently a sporadic infection, Farm A.	Diffuse pneumonia.	None.
578	April 1, 1921	Cow, exposed during outbreak on Farm A.	Nodular, necrotic pneumonia.	None.
583	Mar. 23, 1921	Calf, Farm A.	Apparently umbilical infection, septicemia with pneumonia.	None.
529	Nov. 8, 1920	Calf, farm on Long Island.	Focal consolidation in right caudal lobe; necrotic nodule in left caudal lobe.	<i>Spirillum</i> and spore-bearing bacilli.
6	Jan. 15, 1917	Calf, small outbreak in 1917, Farm A.	Complete consolidation of anterior portion of right cephalic lobe; nodular areas in posterior half; purulent exudate in trachea and bronchus.	None.
209	Mar. 5, 1918	Calf, Farm A.	Diffuse pneumonia.	<i>B. actinoides</i> .
432	Oct. 21, 1919	Calf, Farm A.	Diffuse pneumonia.	<i>B. actinoides</i> , <i>B. pyogenes</i> .
436	Nov. 4, 1919	Calf, Farm A.	Diffuse pneumonia.	Serum-liquefying organism.
502	May 8, 1920	Calf, lung obtained from abattoir in New York City.	Gray to red consolidation of right cephalic lobe.	None. <i>B. necrophorus</i> in liver.
558	Jan. 1, 1921	Calf, Farm A.	Diffuse pneumonia.	<i>B. actinoides</i> .
Bov. Pn. I	About 1913	Calf, Massachusetts.	Necrotic pneumonia.	None.
9	Feb. 17, 1917	Calf, Farm A.	Diffuse pneumonia.	<i>B. actinoides</i> , cocci.

ties of cows in the small outbreak previously referred to. The first case occurring in a calf (550) was associated with *Staphylococcus albus*; 562 was a pure *bovis-septicus* infection; 578 and 583 were cases which occurred in a cow and a calf after the outbreak had subsided. Culture 529 was obtained from a calf on a farm on Long Island. Cultures 6, 209, 432, 436, 502 and 558 were all isolated by Dr. Smith from cases of pneumonia in calves, and in the main they were associated with *Bacillus actinoides*. In most instances *B. actinoides* predominated and is held to be the primary agent. All strains except 558 were isolated before the outbreak occurred in the adult cows. Strain 502 was obtained from the lung of a calf slaughtered in an abattoir in New York. The only available record of culture Pn. I is given in Table 1. Strain 9 was associated with *B. actinoides* and cocci.

The literature concerning the more specific cultural characters and immunological relationship of various types of *Bacillus*

bovisepiticus is meager. Many of the observations were made before the various substances used in fermentation tests came into use. Early immunological studies consisted of attempts to protect laboratory animals with immune sera against small doses of virulent culture. T. Smith (3) described certain of the fermentation characters of *B. bovisepiticus*. He found that all strains fermented dextrose and saccharose but failed to produce acid in milk or lactose. Some produced indol; others failed to do so. All formed phenol. He recognized the close resemblance existing between *B. bovisepiticus* and *B. suisepiticus*. Ostertag (4) compared cultures of *B. bovisepiticus* with organisms from swine plague and chicken cholera and concluded that his cultures were identical.

Shirop (5) studied three strains of *B. vitulisepticus* isolated from pneumonia of calves. He likewise compared these organisms with cultures of *B. avisepticus* and *B. suisepiticus*. It was found that two of the cultures obtained from calves and the swine plague and chicken cholera bacilli possessed similar fermentation characters. They attacked dextrose, saccharose, but did not ferment mannit. The other calf organism attacked only dextrose. All produced indol.

Magnusson (6) records an outbreak of hemorrhagic septicemia among the reindeer in Lapland. He compared the organism isolated from the reindeer with a strain of *B. bovisepiticus* and a culture of *B. avisepticus*. He was unable to show cultural differences. All produced acid in lactose, saccharose and mannit, but none fermented maltose.

Besemer's (7) studies of the fermentation characters of ten strains of pasteurilla led him to conclude that the members of this group were practically uniform in their biochemical actions. From his tables it will be noted that both strains of *B. bovisepiticus* the two cultures of the chicken cholera bacillus, *B. suisepiticus*, and three of Magnusson's reindeer pasteurilla attacked dextrose, saccharose and mannit, but failed to ferment lactose and maltose. Two of Magnusson's calf pasteurilla differed from the others in their ability to ferment lactose.

From the available literature one gains the impression that *B. bovisepiticus* and the allied organisms, such as those isolated from calves and reindeer, are a definite type which can not be

differentiated from each other or from other members of the hemorrhagic septicemia group. A careful study of the tables of the various observers indicates that certain differences do exist. The ability of a few of Magnusson's and Besemer's organisms to ferment lactose is indicative of cultural differences. Most of the conclusions were drawn on the study of three or four organisms.

It has been mentioned that all strains referred to in Table 1 resembled each other morphologically. Capsules could be demonstrated for all organisms except strain 9. All were negative to Gram stain. None were motile. It soon became apparent that a study of the fermentation and other characters would aid in separating the organisms into distinct cultural groups. Tubes of fermented bouillon containing 1 per cent of dextrose, lactose, saccharose, maltose, mannit and salicin were used to test acid production. Titrations and hydrogen ion concentrations were determined after 7 days' incubation at 38 degrees C. The results of these and other tests are given in Table 2.

It will be noted that the sixteen strains fall into three groups. Group I is made up of the cultures (530, 533, 537) isolated from the lungs of cows during the outbreak. Strains 550, 562, 578 and 583, obtained from sporadic cases in adults and calves which appeared after the outbreak, also fall into Group I. Culture 529 is identical in all respects with the others. Group 1 organisms then can be characterized as those which ferment dextrose, lactose, saccharose, maltose and mannit. They produce clear zones of hemolysis about the deep colonies in horse blood agar plate cultures. They are not soluble in ox or guinea-pig bile. They do not form indol. In certain instances it seemed doubtful whether lactose had been fermented or not. Subsequent tests in lactose broth showed that the organisms attacked this sugar to about the same degree as the other substances. In no instance was milk coagulated.

The next aggregation comprises six strains (6, 209, 432, 436, 502, 558) all isolated from calves. These organisms ferment dextrose and saccharose, but do not aciduate media containing lactose, maltose, mannit or salicin. Under suitable conditions they produce alkali in media where no fermentation occurs. All produce indol; none are hemolytic. When ox or guinea-pig bile is added to 24-hour bouillon cultures the medium becomes clear.

TABLE 2.—CULTURAL CHARACTERS OF SIXTEEN STRAINS OF BACILLUS BOVISEPTICUS.

Number	Dextrose		Lactose		Saccharose		Maltose		Mannit		Salicin		Indol	He-moly-sis	Bile-solubility
	Titration	pH	Titration	pH	Titration	pH	Titration	pH	Titration	pH	Titration	pH			
530	2.6	6.2	1.8	6.7	2.7	6.2	2.9	6.2	2.7	6.3	1.2	7.6	—	+	—
533	3.6	6.2	1.7	6.8	3.4	6.3	2.8	6.2	2.6	6.3	1.0	7.5	—	+	—
537	2.7	6.1	1.8	6.7	2.4	6.4	2.7	6.2	2.6	6.2	0.9	7.5	—	+	—
550	3.0	6.1	1.6	6.8	2.4	6.2	2.6	6.3	2.6	6.3	1.0	7.5	—	+	—
562	2.5	6.3	1.9	6.6	2.6	6.3	2.6	6.3	2.5	6.4	0.9	7.5	—	+	—
578	2.8	6.2	2.6	6.4	2.8	6.4	3.1	6.2	2.7	6.3	1.0	7.5	—	+	—
583	2.9	6.1	2.5	6.5	3.3	6.1	3.0	6.3	2.9	6.2	0.9	7.5	—	+	—
529	2.5	6.2	1.7	6.7	2.7	6.4	2.8	6.4	2.5	6.5	1.3	7.3	—	+	—
6	2.5	6.3	0.2	7.9	2.2	6.4	0.6	7.8	0.5	7.9	0.9	7.5	—	+	—
209	2.5	6.3	1.0	7.4	2.6	6.4	1.3	7.6	1.3	7.5	1.4	7.7	—	+	—
432	2.6	6.3	0.6	7.6	2.5	6.4	0.8	7.5	1.0	7.6	1.1	7.4	—	+	—
436	2.4	6.5	0.9	7.5	2.0	6.6	1.0	7.5	1.0	7.5	1.0	7.5	—	+	—
502	2.7	6.1	1.0	7.4	2.7	6.4	1.1	7.5	1.0	7.5	1.0	7.5	—	+	—
558	2.8	6.3	1.0	7.4	2.7	6.2	1.1	7.5	1.0	7.5	1.0	7.4	—	+	—
Boy. Po. I	2.8	5.9	0.6	7.4	2.7	6.1	0.7	7.5	2.8	6.1	1.2	7.8	—	+	—
9	2.9	5.8	1.0	7.8	2.5	5.9	1.1	7.8	2.5	6.2	0.9	7.5	—	+	—

The two remaining cultures (Bov. Pn. 1 and 9) fall into a distinct group. Media containing dextrose, saccharose and mannit are acidulated. No fermentation occurs in lactose, maltose or salicin broth, although alkali is produced under suitable conditions in such tubes. Both strains form indol. They do not hemolyze horse red blood cells and they are insoluble in bile.

Recently all strains were tested for inulin fermentation. In no instance was acid produced.

Pathogenicity.—The members of Group I are of relatively low virulence for laboratory animals. One-fourth of a cubic centimeter of freshly isolated 24-hour bouillon cultures when injected beneath the skin of rabbits produced only mild local reactions. A calf injected in the subcutis with the pleural exudate from a cow dying of pneumonia developed only a slight local reaction. Intratracheal injection of a calf with 10 c.c. of bouillon culture failed to cause marked disturbances. Group II cultures are slightly more virulent for mice and rabbits. One-fourth of a cubic centimeter of a 24-hour bouillon culture injected beneath the skin of a rabbit usually causes a marked local inflammation which may be absorbed or may terminate in an abscess. Culture Bov. Pn. I of Group III, although under cultivation since 1913, is still virulent. Rabbits die within three or four days when injected subcutaneously.

Reference has been made to earlier attempts to determine immunological relationship between various members of the *pasteurella* group by means of various protection tests. The agglutination test has in recent years become well recognized as a method of grouping organisms. Accounts of its use in separating the *pasteurella* have not been met with. Magnusson repeatedly injected a sheep with a culture of the reindeer organism but was unable to demonstrate agglutinins. Shirop makes no mention of agglutinins in the blood of rabbits immunized with *Bacillus vitulisepticus*. Hadley (8) succeeded in producing a serum by injecting a rabbit with *B. avisepticus*. The serum agglutinated the homologous culture at a dilution of 1:160.

It was decided to attempt to group the organisms serologically by means of their agglutination affinities. Rabbits were immunized with a single strain chosen from each group. It

soon became apparent that the rabbits receiving Group I and Group II strains developed agglutinins slowly. Individuals receiving a single Group III culture produced agglutinins much more rapidly. Tests were made from time to time; when it seemed that the maximum titer was reached the animals were bled. Each individual's serum was tested against all strains. The results are recorded in Table 3.

It may be mentioned that the best results were obtained when the growths from 24-hour slant agar cultures suspended in salt solution were used as antigens. The density of the suspensions was about 2.5 with the Gates's (9) apparatus. All tubes were incubated at 38 degrees C. for 18 hours. Groups I and II agglutinate slowly; clumps are rarely visible before the sixth or eighth hour. Agglutination of the Group III organisms takes place rapidly; clumps begin to form in a few minutes, and all the organisms are usually down within 6 or 8 hours.

From Table 3 it will be noted that the serological grouping follows the cultural grouping to a considerable degree. All strains of Group I are agglutinated well up to the titer limits with Group I serum. All strains of Group II, except 502, are likewise agglutinated by their homologous group serum. The same holds true for Group III. In no instance has cross agglutination taken place. When the serum is absorbed by a single group strain the agglutinins are uniformly absorbed for all members of the group.

Strain 502, although possessing cultural characters in common with Group II, fails to excite the same immunological process. Dochez and Gillespie (10) have brought out the fact that among the pneumococci distinct serological differences exist among organisms having cultural characters in common.

The production of a polyvalent serum was next attempted. Rabbits were immunized with suspensions of cultures 530, 432, 502 and Bov. Pn. I. As in the previous observations, strong agglutinins for strain Bov. Pn. I developed rapidly. Tests against culture 530 showed moderate agglutinin formation. The agglutinins were not as strong for culture 432. Apparently strain 502 excites but little agglutinin formation in the rabbit, since it was incompletely clumped only in the lowest dilutions (1:5 and 1:10).

DISCUSSION

It might be well to emphasize some of the more important points brought out by these observations. That the term *Bacillus bovissepticus* can no longer be taken to represent a single strain or species of organism seems clear. From the limited material available it has been possible to recognize three distinct cultural groups. Perhaps a study of a greater number of cultures may disclose a larger number of aggregations. In fact at this time another culture has been isolated which differs from any of those described. Of still more importance to those concerned in the study of animal diseases are the serological differences manifested. In the main the serological grouping follows the cultural grouping. A single strain has produced agglutinins for all other strains with similar characters. This has held true with a single exception. Perhaps a study of more strains may disclose more immunological groups. These facts must be taken into account when attempts are made to control outbreaks with antisera or vaccines.

Through a knowledge of the specific characters of members of the *bovissepticus* organisms it has been possible to trace various types of infection in a particular herd. One of the first strains isolated (9) was obtained in February, 1917. This is the only Group III organism cultivated from this herd. Early in 1917 a Group II culture (6) was isolated by Dr. Smith. During the years 1918, 1919, 1920, and in January, 1921, he found such organisms in calves associated with primary infections with *B. actinoides*. Evidently this type had become endemic. During the later months of 1920 a fresh virus (Group I) was introduced with newly purchased cows. A small outbreak promptly ensued. This subsided, but sporadic cases continued to develop in both the adults and calves. This organism has become the predominating type. Future studies will determine whether or not it will entirely replace the preceding types and in turn be replaced by a freshly introduced virus.

SUMMARY

Sixteen organisms isolated from cases of pneumonia occurring in cows and calves have been studied. Morphologically all cultures resemble each other. It has been possible by studying their fermentation and other characters to divide them into three well-defined groups. In the main serological relation-

ship has been found to follow the cultural grouping. A serum prepared by immunizing a rabbit with a single Group I strain agglutinates all Group I cultures. The same is largely true for Groups II and III. In no instance has cross agglutination occurred. Absorption of a serum with a single group strain exhausts the agglutinin to the same degree for all group strains.

LITERATURE CITED

1. JONES, F. S., and LITTLE, R. B. Jour. Expt. Med., 1921, vol. 34, p. 541.
2. SMITH, T. Jour. Expt. Med., 1921, vol. 33, p. 441.
3. SMITH, T. U. S. Dept. Agr., Bur. Anim. Indus., 12th and 13th Ann. Repts., 1895-1896, p. 119.
4. OSTERTAG, R. Ztschr. Infekt. der Haust., 1908, vol. 14, p. 1.
5. SHIROP, H. Centrbl. Bakt., etc., 1 abt. Orig., 1908, vol. 47, p. 307.
6. MAGNUSSON. Ztschr. Infekt. der Haust., 1914, vol. 15, p. 61.
7. BESEMER, A. M. Jour. Bact., 1917, vol. 2, p. 177.
8. HADLEY, PHILIP. Jour. Bact., 1918, vol. 3, p. 277.
9. GATES, F. L. Jour. Expt. Med., 1920, vol. 31, p. 105.
10. DOCHEZ, R., and GILLESPIE, L. F. Jour. Amer. Med. Assoc., 1913, vol. 65, p. 727.

DISCUSSION

DR. HOSKINS: Mr. Chairman, I am very glad Dr. Jones was given an opportunity to present his paper. For a number of years we have been trying to get somebody from the Rockefeller Institute, either Dr. Smith or Dr. Jones, to contribute to the program of the Section on Sanitary Science and Police. This year it appears we have been successful. Personally, I am very much gratified that this opportunity was given Dr. Jones this morning.

I would like to discuss the paper very briefly. I brought a paper to this meeting which was read by title in the Section on Education and Research, dealing with some investigations on bovine hemorrhagic septicemia, more specifically the shipping fever of calves, which is looked upon more as the pulmonary type of hemorrhagic septicemia in cattle. A very brief summary of the contents of that paper shows that we were able to isolate two types of *Bacterium bovissepticum* from the same animal. These two types were not differentiated in the same manner that Dr. Jones has used for differentiating his types. Our two types differ more according to virulence. Of the two types which we isolated one was secured from the lungs of a

calf dead of stocks-yards pneumonia, or shipping fever, and the other strain was isolated from the hemorrhagic muscle tissue, presumably the blood, of the same calf. The lung strain was obtained by plating. An emulsion of the same material which gave us the organism by plating failed to kill rabbits. We speak of that as our non-virulent lung strain.

The other strain, obtained from the muscle, was isolated both by plating and by rabbit passage. We speak of that as our virulent muscle strain. Bear in mind that these two strains, a virulent and a non-virulent, were isolated from the carcass of the same animal. These two strains agree with either Dr. Jones' type two or type three. They have the usually accepted fermentation reactions, dextrose positive, lactose negative, and saccharose positive. Both strains are much alike morphologically and culturally, except when we come to examine bouillon cultures. There the two strains show marked differences. These agree with the differences described recently by De Kruijff, in his study of rabbit septicemia, where he has apparently demonstrated the co-existence of virulent and non-virulent strains of the rabbit septicemia organism in the same culture. I believe we have gone one step further in isolating the two strains separately from the same animal.

Two years ago I presented a paper before the Missouri Valley Veterinary Association, and at that time predicted that some of these days we would be dividing or typing the hemorrhagic septicemia organisms very much in the same manner as we are now typing the pneumococcus group. I believe that Dr. Jones has made true that prediction.

I believe I will say, however, that if in isolating a hemorrhagic septicemia organism from suspected material, we obtain an organism which corresponds to Dr. Jones' type one, personally, I would hesitate to call it a hemorrhagic septicemia organism. You will note that it ferments lactose and that it is hemolytic. Those two characteristics in themselves would prompt me to throw it out as a typical hemorrhagic septicemia organism. Also, bear in mind the difference in the agglutination tests, as shown in the lower table. Note that where you take strictly true types, either two or three, and cross-agglutinate against type one, there is no cross-agglutination.

DR. JONES: Group one is apparently what Magnusson de-

scribes in Lapland. The American Bacteriological Association has established a new tribe called *pasteurella*. Their requirement for the hemorrhagic septicemia is that they are non-motile rods which produce a little acid in carbohydrates. They are negative to Gram stain and parasitic for animals. Certainly group one can well be placed within such classification. For these reasons they have been placed with the *pasteurella*. They are undoubtedly what people have always assumed to be *bovisepiticus*. Whether they are or not, time will tell.

DR. EICHHORN: May I ask if Dr. Jones has conducted any experiments along immunological lines?

DR. JONES: A little work along this line has been done. I can produce protecting serum for group three organism. A group two serum has thus far failed to protect against group two cultures.

ANTITUBERCULOSIS VACCINATION

The work of Calmette and Guérin on the vaccination of cattle against tuberculosis with cultures of bovine bacilli grown on bile and glycerin, which has been previously referred to in *THE JOURNAL*,¹ is reviewed and discussed by L. Panisset in the *Revue Générale de Médecine Vétérinaire*,² with the following conclusion:

"The practical value of the method of Calmette and Guérin can be determined only by extended experimentation on a large number of animals during a number of years corresponding to the mean duration of the economic life of bovines. However, in the light of the results already obtained, the bacillus cultivated on bile is worthy of attention because of its harmlessness for bovines and the slowness of its resorption. Furthermore, it is harmless to man. We may therefore admit that it is worth using for the vaccination of bovines, without danger, for conferring on them, if not immunity, the resistance of which research in antituberculosis vaccination has revealed the mechanism and demonstrated the possible realization."

Recently-qualified and somewhat haughty graduate: "Oh, yes, my practice has increased 100 per cent since Christmas."

Candid acquaintance: "Somebody brought in another dog, then?"—*The Veterinary Record*.

¹ Vol. 11 (n. s.), p. 599, Feb., 1921; vol. 12, p. 274, June, 1921.

² Vol. 30, p. 313, June 15, 1921.

CLINICAL AIDS IN THE DIFFERENTIAL DIAGNOSIS OF THE COMMON POULTRY DISEASES¹

By F. R. BEAUDETTE

Manhattan, Kansas

THIS PAPER is written with the view of aiding the general practitioner in the differential diagnosis of the more common poultry diseases and not as a guide for laboratory diagnosis. The diseases discussed will be those peculiar to this section of the country. It is realized that the practitioner's diagnosis in most cases must be made in the field without laboratory facilities and that his judgment is based principally upon the history, symptoms and postmortem findings; therefore these points will be discussed rather than a detailed description of the bacteriological findings in the case. In the septicemias a differentiation is very often impossible and must be determined by a bacteriological examination. Such a differentiation is often not necessary, since the control measures for one will suffice for the other. In those cases where vaccine therapy is to be used, an accurate diagnosis is, of course, necessary, and here the laboratory may be called upon for confirmation.

An analysis of the records shows that roup is the most widespread and most frequent disease of poultry with which we have to contend. Contrary to most opinions, this condition is found to occur throughout the year, and not in winter, as is commonly supposed. The ravages of cholera are found to decrease somewhat during the winter months, while fowl typhoid seems to be more prevalent in spring and early summer. Black-head appears to be most common in the month of October, and tuberculosis has no seasonal variations. White diarrhea is, of course, a seasonal disease, occurring during the hatching months of March, April and May. This year botulism has been encountered very often, especially after heavy rains.

This paper will, therefore, necessitate a discussion of the above-mentioned diseases, together with those rare maladies from which they are to be differentiated.

¹ Presented at the fifty-eighth annual meeting of the American Veterinary Medical Association, Denver, Colo., September 5-9, 1921.

FOWL CHOLERA

Fowl cholera is an acute infectious disease of a septicemic nature affecting fowls, geese, ducks, turkeys and pigeons. It is characterized by a continuous high fever, diarrhea and general depression. The mortality may run as high as 90 per cent. The course of the disease is rapid, death often occurring in 24 hours after symptoms have developed. One usually gets the history that dead birds were found under the roots or on the nests. In very acute cases prodromal symptoms are often absent. In chronic cases the birds may linger for several weeks and in some cases recover. Affected birds are greatly depressed; the head is held close to the body, the feathers are ruffled, the comb and wattles are usually cyanotic, and a diarrhea is always present. The color of the droppings is usually yellow, though they may be of a greenish tinge or even streaked with blood. The bird refuses food and in the later stages of fatal cases water is also refused. The eyes are kept closed in the later stages of the disease, and a slime collects in the mouth. In chronic cases emaciation is quite marked.

On opening the carcass of a bird dead of cholera the typical picture of a septicemic disease is found. The blood vessels of the intestines are highly congested. Hemorrhages are found throughout the intestines, though more particularly in the first and second portions of the duodenum, and in the rectum, and less frequently in the ceca. The liver is congested and friable. The kidneys are marked with white lines indicating the portion of the tubules distended with urates. The ureters are likewise filled with the same material. The spleen is congested and friable. The pericardial sac is partially filled with a straw-colored fluid which may be fibrinous, and the surface of the heart shows petechial or ecchymotic hemorrhages, particularly along the course of the coronary vessels. The lungs are usually pneumonic.

Cholera is to be differentiated from fowl typhoid, which at times is very difficult. In fowl typhoid the same symptoms may be present with the exception of a profuse diarrhea. If diarrhea is present in the latter condition the droppings are more greenish in appearance. In fowl typhoid the comb and wattles are rarely cyanotic, though they may show congestion; usually they are anemic. The intestines contain a more solid mass and appear anemic. The duodenum may contain a quantity of bile

giving it a greenish tinge. White spots on the surface of the liver and heart in the case of fowl typhoid will aid in the differentiation. The temperature and color of the comb will differentiate cholera from botulism.

FOWL TYPHOID

Fowl typhoid is also a specific infectious disease of the fowl, and at present is more prevalent in this section than cholera. As previously stated, the comb and wattles are usually dry and anemic. The mucous membranes of the head are pale and the bird is depressed. Older stock is more often affected than young. Unlike cholera, the course may extend over a week or so, except in chronic cases, when it is much longer. The mortality is at times as high as in cholera.

The autopsy shows an anemic condition of the intestines, though there may be petechial hemorrhages in the first and second portions of the duodenum. They contain little feces, and this is usually stained with bile. The liver shows on its surface white spots about the size of a pin-head and the spleen is congested and softened. The kidneys are usually of a clay color; at other times congestion is outstanding. Distention of the gall bladder is almost a constant finding. The heart shows white spots similar to those of the liver. The lungs are normal in contrast to the pneumonic condition in cholera.

ROUP

Roup is an infectious disease which may manifest itself in several ways. The condition is variably termed contagious catarrh, coryza, cold, pox, diphtheria, swell head, contagious epithelioma, etc., depending on the location of the lesions. One or more forms may be present in the same individual.

The mortality of roup is from 5 to 80 per cent, and the course varies with the severity of the disease and parts affected. In the cutaneous form recovery may take place in a week or so and the mortality is very low, while in the diphtheritic and ocular forms the course is much longer and the mortality is usually high. In all cases the egg production is decreased. It is a disease of the mucous membranes of the head and the unfeathered portions of the body. Birds of all ages are affected except chicks a few days old. When the nasal cavity is involved there is at first a dirty, foul-smelling discharge; later this be-

comes thicker and finally causes the stoppage of the cavity. The mass may enlarge and cause a bulging in the mouth. The bird is compelled to breathe through the mouth, and this may cause a drying of the tongue, often called pip, which may result from any condition that will cause a drying of the tongue, usually associated with oral breathing.

The mouth is the location of the diphtheritic form, and here patches of false membrane are found, which vary in size from a pin-head to several millimeters in diameter. At first they are white; later they turn gray or yellowish brown. They may be removed from their attachment, and an easily bleeding raw surface is left, from which another membrane may develop. These patches may be located anywhere in the mouth, and may extend down the trachea to the bronchi or down the esophagus to the crop. When lesions are located in the larynx the gravity of the condition is increased.

In the ocular type a watery discharge from the eye is first noticed. This becomes thicker, and the frequent closing of the eye causes the material to become frothy. Finally the eyelids are glued together and the mass collects beneath. If the pressure is not released, destruction of the eye will result. If the lids are separated a yellow, cheesy mass protrudes. A similar mass may collect in the suborbital sinus, causing a bulging over that point, hence the term "swellhead."

The cutaneous form is popularly termed chicken pox or contagious epithelioma. The comb and wattles and occasionally the unfeathered portions of the body are found to be affected. This form manifests itself by the formation of wartlike growths which may vary in size from a pin-head to several millimeters in diameter. The eyelids may be covered with the growths. When the growths are found in the corners of the mouth the process is usually continued to the oral cavity as the diphtheritic form. A removal of the wart leaves a granular, easily bleeding surface, from which another growth may develop.

Rarely an involvement of the joints of the legs and wings is found. This constitutes what might be called an articular roup. The characteristic exudate in such cases is found in the joint cavity, which seriously interferes with movement of the part. There is swelling and on palpation the area feels hot.

TUBERCULOSIS

Tuberculosis is a common disease of the fowl, characterized by "going light," to use the poultryman's term. Geese, turkeys and pigeons are also subject to this malady.

The symptoms are few until the disease is far advanced. Whenever individuals gradually emaciate and finally die, tuberculosis may be suspected. In the later stages of the disease the comb appears anemic, the bird is very light, the sternum is almost devoid of flesh, and the general appearance is that of an unthrifty condition. The individual is disposed to remain in one position with the head drawn close to the body and the tail feathers drooped. The appetite is usually poor.

It must be remembered that tuberculosis in the fowl is principally a disease of the abdominal organs, and especially of the spleen. It is estimated that in 90 per cent of the cases the spleen is found to be affected. The lesions are found in the organs themselves, and not in the lymph nodes which drain them, as in the case of other animals. Caseation rather than calcification is the rule. The nodules are about the size of a pin-head, though larger ones may be found. Whatever the size, they are usually uniform and equally distributed. The intestines may show nodules externally, the size of a pea, and these are extended throughout the length of the gut. The appearance of the intestines resembles somewhat that of an infestation with *Davainea tetragona*, the parasite causing nodular teniasis. A heavy infestation of the air-sac mite, *Cytodites nudus*, will cause an emaciation similar to tuberculosis, though in this case the lesions of tuberculosis are absent and the parasites can be found as white specks usually on the folds of the mesentery. In aspergillosis emaciation is an outstanding symptom, hence this condition is to be differentiated from tuberculosis by finding the areas of fungoid growth in the lungs or between the lungs and the thoracic wall. Lung lesions in the case of tuberculosis are relatively rare, and when present there is usually an extensive involvement of the abdominal organs. Bumblefoot may be confused with the articular form of tuberculosis, and is differentiated by a post-mortem and the more subcutaneous location of the lesion. Birds heavily infested with intestinal parasites may show symptoms not unlike tuberculosis, but an examination of the intestinal tract will disclose the presence of parasites.

BLACKHEAD

Infectious enterohepatitis or blackhead is a highly destructive disease of turkeys, though chickens occasionally are affected. The period of incubation is from three to four weeks. The course of the disease depends upon the age of the affected bird. In young chicks this may be a week, while older birds will linger for three or four weeks before death takes place. Affected birds are drowsy and indisposed to move. When forced to move, a slow gait is characteristic. The appetite is diminished, though water is taken as usual. A diarrhea is always present from the start, and the characteristic yellow color will aid in the diagnosis. In the last stages of the disease the comb becomes very dark as a rule, hence the term "blackhead."

The lesions are confined principally to the liver and intestines, particularly the ceca. On the liver ulcers may be found of various sizes, from a pin-head to several millimeters in diameter. These are usually depressed and of a yellowish color. In advanced cases the organ may be literally covered. The blind gut presents a chronically thickened appearance. In acute cases in poults the liver may be free from lesions while the ceca shows but slight ulceration or congestion.

The fact that this is principally a disease of young stock will aid in the differentiation. The hepatic ulcers are sufficient to differentiate this condition from other diseases, especially tuberculosis of the liver, since in the latter condition there is a lack of depression. In chickens the liver rarely shows ulceration. The lesions are principally confined to the ceca, though even here they may be absent. The absence of other lesions and the finding of solid blood-stained cores in the ceca will indicate this affection in fowls.

WHITE DIARRHEA

Bacillary white diarrhea is practically the only infectious disease of importance affecting chicks, though certain noninfectious diseases may bear some resemblance to this condition. The disease is contracted as an ovarian infection through the egg, the hen being but a carrier of the organism. Chicks may also contract the infection from incubators, etc., previously contaminated by infected chicks. Chicks are most susceptible during the first two or three days after hatching; after this time they are relatively immune. The mortality runs very high and may reach 80 or 90 per cent.

Diarrhea is the outstanding symptom and the droppings are white and thin mixed with considerable mucus. The chick peeps constantly as if in pain. An unthrifty condition is noticeable, the neck is drawn in, and the wings are drooping. The chicks are usually found close to the hover. The abdomen is usually enlarged, giving the chick a "pot-bellied" appearance. The hind parts become soiled with the excrement, and "pasting up" is not uncommon. As a fatal termination approaches, the affected individual falls to the ground and after a period of coma dies. On opening the chick the yolk is found unabsorbed. A yellow color of the liver is usually observed. The intestines contain a semisolid material with much mucus. The lungs show congestion.

The high mortality immediately after hatching, together with the absence of lesion other than those of the liver, are diagnostic of this condition. Another condition resembling white diarrhea has been found in this section, though in the latter case very few chicks are hatched from infected eggs. The infection usually kills the chicks about the nineteenth day of incubation. If the chick does hatch it usually dies in the course of a few days. The lesions are not distinguishable from those of white diarrhea, though the organism differs markedly.

Rose-chaffer poisoning is to be differentiated from white diarrhea by the finding of the chafers in the crop. The latter condition is found more often in the southern section of the country about the hatching time and early summer.

BOTULISM OR LIMBERNECK

Another condition quite common this year in this section has been diagnosed as botulism, commonly termed "limberneck." The onset of this disease is very sudden. Half of the flock may die in the course of two or three days. It has been noticed to occur especially after a season of heavy rainfall, which perhaps favored the development of the toxin in the food material. Occasionally a history of feeding garbage containing spoiled canned goods is obtained.

Affected birds may be able to stand, though the individual is unable to hold its head up, and the top of the comb may touch the ground. In other cases the bird lies lifeless on the ground with the head stretched out in front. The comb and wattles are of a distinct bright red color, and this symptom is of consider-

able diagnostic importance. The eyes are kept closed, and a slimy material collects in the mouth. Diarrhea may be present and the area surrounding the vent is of a bright red color. In the later stages of the disease the feathers are found to come out easily. The temperature is at first normal or slightly elevated; later it gradually becomes subnormal and may go as low as 92 degrees F. If the temperature begins to rise after being subnormal, recovery can be predicted. The birds refuse food and water entirely until recovery takes place. The only lesions found are confined to the intestinal tract, and these are in the nature of a catarrhal enteritis throughout, and in some cases petechial hemorrhages are found.

Botulism is differentiated from cholera by the limberneck symptom and the absence of lesions other than those of the intestinal tract. The subnormal temperature is to be considered as diagnostic, and the absence of cyanosis of the comb is a constant feature. The lack of white spots on the liver and heart will aid in the differentiation from fowl typhoid.

It will be seen that the greatest difficulty will be experienced in differentiating between cholera, fowl typhoid, and possibly botulism. While the latter condition is characterized by a subnormal temperature, bright red color of the comb and "limberneck" symptoms, the former two are to be differentiated by a careful inquiry into the history and by observation of the post-mortem findings.

Dr. H. Martel, chief of the bureau of veterinary inspection for Paris and the department of the Seine, has made an investigation into the condition of cans containing frozen opened eggs intended for the use of bakers, following the occurrence of many cases of poisoning from eating pastry and cakes with "cream" fillings made with such eggs. In many cans were found mold, streptococci, staphylococci and *Bacillus coli*. The eggs in question were imported from China. Dr. Martel has recommended sanitary precautions to guard against the danger. It is said that the frozen eggs should not be allowed to thaw until shortly before use and should be used only for prolonged baking at a high temperature.

According to a news item a female fly lays ten thousand eggs. Thank goodness a female fly does not cackle.—*London Punch*.

THE HYDROGEN ION CONCENTRATION OF HORSE SEMEN¹

By W. S. ANDERSON, A. M. PETER and D. J. HEALY

Lexington, Ky.

MANY noted Thoroughbred and Standardbred stallions are located in the bluegrass region of Kentucky and the breeding of such animals is an important industry. The uncertainty of impregnation of the mare is one of the difficulties encountered and at times causes serious financial loss.

A microscopical study of the semen of those stallions which failed to impregnate the mares demonstrated that many, in some cases all, of the spermatozoa were motionless immediately after copulation. It occurred to us that a study of the hydrogen ion concentration of the semen in relation to the motility of the spermatozoa would be interesting and valuable. Upon examining the literature we failed to find a record of the hydrogen ion concentration of semen.

All protoplasm carries electric charges, and every living cell is essentially an electric battery. Protoplasmic activity develops an electric disturbance, the current flowing from the more active to the less active portion of the protoplasm, and many of the activities of protoplasm bear a direct relation to the ratio of electrolytes which it contains. Of the many electrolytes present in protoplasm, the hydrogen ion has been most successfully studied, and its concentration has been correlated with many of the physiological activities of biologic tissues and fluids.

The chemical reaction of protoplasm may be expressed in terms of hydrogen ion concentration, and very slight variations in this concentration profoundly affect the colloidal condition, enzymic activity and respiratory processes of protoplasm.

Living cells require the maintenance of a strictly limited hydrogen ion concentration in their environment, a limitation frequently between 0.00001 and 0.00000001 gram ionized hydrogen per liter. Enzymes are extraordinarily sensitive to minute changes in the hydrogen ion concentration of the medium in which they are working. Reed demonstrated that the oxidases

¹ Presented at the fifty-eighth annual meeting of the American Veterinary Medical Association, Denver, Colo., September 5-9, 1921.

present in the potato and apple were quite active at pH 4.2 and inactive at pH 3.3. Fortunately protoplasm contains salts of carbonic and phosphoric acids, which act as "buffers," checking pronounced changes in hydrogen ion concentration, the bicarbonate acting by releasing or absorbing CO_2 , while the phosphates readily change from mono to diphosphate and vice versa.

Some of the more important biologic fluids of which the hydrogen ion concentration has been determined by others are gastric juice, pH 0.9–1.6; perspiration, pH 4.5; urine, pH 6; milk (cow), pH 6.6–6.8; muscle juice, pH 6.8; blood, pH 7.4; normal plant cell sap, pH 5.3–5.8. It is interesting to note that gastric juice contains a free mineral acid in considerable strength and that it may be kept for months without becoming putrid and with very little change in its digestive action or in its total acidity.

Modern methods of determining hydrogen ion concentration are much more reliable than methods of determining the chemical reaction of protoplasm based upon its color reactions to various staining reagents. Two methods are available for the measurement of hydrogen ion concentration in solutions—the colorimetric and the electrometric. The color indicators of chemical reaction are substances which ionize in solutions containing definite hydrogen ion concentrations. Above a certain concentration of hydrogen ions phenolphthalein in solution remains undissociated and colorless. Below this concentration of hydrogen ions phenolphthalein dissociates with the production of color. Methyl red in solution dissociates with a change of color at a hydrogen ion concentration greater than that at which phenolphthalein dissociates. Thus a series of indicators which dissociate with change of color at successively diminishing hydrogen ion concentrations have been obtained and may be used to determine the hydrogen ion concentration of solutions at various points between N/10 HCl and N/10 NH_4OH .

The hydrogen ion carries a positive electric charge, thus maintaining an electric potential in the solution. The electrometric method measures this potential by means of a potentiometer and galvanometer. When the biological process under observation is constant over a wide range of hydrogen ion concentration, an approximate determination is sufficient, and the colorimetric method may be used. When the process is seriously affected by the hydrogen ion concentration of the solution, the

electrometric method should be used, because it is the most accurate method available. Minute variations in hydrogen ion concentrations indicate the position of equilibrium among the important electrolytes present. Thus the determination of hydrogen ion concentration takes its place beside the use of the delicate analytical balance or the use of the thermometer.

The apparatus used in this investigation consisted of the Clark hydrogen ion apparatus supplied by the Leeds and Northrup Company, a portable lamp and scale galvanometer, a Leeds and Northrup type K potentiometer, and a standard Weston cell, model 4. Two Columbia dry cells furnished the working current. Hydrogen, obtained from a Kipp's generator, was passed through two wash bottles (the first containing N 2 NaOH and a small quantity of lead acetate, the second containing distilled water), and then conducted into the hydrogen electrode vessel. A normal KCl calomel electrode was used, and normal KCl solution saturated with calomel was used in the connecting vessel. Measurements were made at room temperature without the aid of a constant temperature bath, but the temperature of the calomel electrode was carefully noted immediately following each measurement, the reading being made to the nearest degree or half degree Centigrade. Following Clark's suggestions hydrogen was not bubbled through the semen. Clark states that "in biological fluids containing carbonate the double effect of the CO_2 upon the partial pressure of hydrogen and upon the hydrogen ion equilibrium renders accurate measurements difficult. It is of more importance to maintain the original CO_2 content of the solution than it is to be concerned about the effect of CO_2 upon the partial pressure of hydrogen."

The accuracy of electrometric measurements made by such an apparatus under the above conditions depends upon the stability of the electromotive force balance for a definite period. In this investigation the E. M. F. balance was maintained for a period of two minutes. To test the accuracy of the measurements a N/10 HCl solution was measured as shown in Table 1.

. As a further test two standard "buffer" solutions were measured electrometrically and colorimetrically as shown in Table 2.

. The colorimetric method measures to two-tenths of a pH value. Tables 1 and 2 demonstrate that without extensive equipment electrometric measurements of hydrogen ion concentrations afford a fair degree of accuracy. Great refinement in

correcting for barometric and temperature fluctuations is necessary only in physico-chemical research.

The semen used in this investigation was obtained as the mare was served and was delivered to the laboratory in a clean sterile container with as little delay as possible. The measurements were made within an hour or two of the service. The quantity

TABLE 1.—MEASUREMENT OF N/10 HCL SOLUTION.

Solution and Measurement	Time	Reading	Temperature	pH Value	Theory
N/10 HCl, factor 1.0006...	10:20	<i>Volt</i> 0.3490	° C 31	1.08	.....
	10:22	.3490			pH 1.07
Duplicate measurement....	10:37	.3475	31	1.06	
	10:39	.3475			

TABLE 2.—ELECTROMETRIC AND COLORIMETRIC MEASUREMENT OF TWO STANDARD BUFFER SOLUTIONS.

Solution and Measurement	Time	Reading	Temperature	pH Value	Colorimetric pH Value
Buffer solution 1	2:17	<i>Volt</i> 0.6995	° C 32	6.88	7.0
	2:19	.6995			
Duplicate measurement..	2:43	.6995	32	6.88	7.0
	2:45	.6995			
Buffer solution 2	3:06	.7670	32	7.99	8.2
	3:08	.7670			
Duplicate measurement..	3:26	.7675	32	8.00	8.2
	3:28	.7675			

of semen obtained varied from 7 to 20 c.c. With the larger quantities of semen the hydrogen electrode vessel was completely filled, the platinum electrode placed in position, the semen flushed out with hydrogen, which was used freely, and the vessel half filled with semen, and, of course, remaining half filled with hydrogen. The hydrogen electrode vessel was now closed and shaken for five minutes, after which it was so adjusted that the platinum electrode was half immersed in the semen and the connections were made with the potentiometer, the apparatus remaining undisturbed for six minutes, after which the readings were made. With the smaller quantities of semen the hydrogen vessel was first filled with CO₂-free water, flushed out with hydrogen, half filled with semen and then treated as above. Measurements were made as shown in Table 3 to de-

termine the effect of thus filling the hydrogen vessel with CO_2 -free water before introducing the semen.

Table 3 demonstrates that the effect of the preliminary use of CO_2 -free water is to reduce the hydrogen ion concentration of the semen 0.125 of a pH value.

With the electrometric measurements of normal horse semen we obtained the results shown in Table 4.

TABLE 3.—MEASUREMENTS TO DETERMINE EFFECT OF FILLING HYDROGEN VESSEL WITH CO_2 -FREE WATER BEFORE INTRODUCING SEMEN.

Semen	Time	Reading	Temperature	pH Value
Sixth Stallion.....	9.50	<i>Voll</i> 0.7280	° C 22.5	7.55
	9.52	.7280		
After using CO_2 -free water.....	10.16	.7379	22.5	7.70
	10.18	.7379		
Seventh Stallion.....	10.42	.7300	22.5	7.58
	10.44	.7300		
After using CO_2 -free water.....	11.03	.7356	22.5	7.68
	11.05	.7356		

TABLE 4.—ELECTROMETRIC MEASUREMENTS OF NORMAL SEMEN.

Stallion	Time	Reading	Temperature	pH Value
		<i>Voll</i>	°C.	
1. Etewa.....	10.11	0.7335	26.5	7.43 ¹
2. Huon.....	9.47	.7230	23.5	7.44
3. Uncle.....	10.03	.7255	23.5	7.47
4. Rapid Water.....	11.13	.7080	19.5	7.14 ¹
9. Prince Palatine.....	9.20	.7010	23.5	6.94 ¹
12. Fritter Gold.....	9.38	.7325	22.0	7.51 ¹
14. Fairplay ²	11.40	.7180	29.0	7.24
Average.....				7.31

¹ Correction for CO_2 -free water (—0.125 pH) has been deducted.

² Sire of Man-O'-War.

The average of seven electrometric measurements of normal horse semen was pH 7.31, ranging from pH 6.94 to pH 7.51.

With horse semen containing nonmotile spermatozoa we obtained the results shown in Table 5.

The average of five measurements of abnormal horse semen was pH 7.58, ranging from pH 7.49 to pH 7.76. Therefore the average hydrogen ion concentration of horse semen containing nonmotile spermatozoa was 0.27 of a pH value less than the average of normal semen.

That the hydrogen ion concentration of horse semen is not readily altered is demonstrated in the accompanying diagram (figure 1). In this experiment we added to one 10 c.c. portion

TABLE 5.—ELECTROMETRIC MEASUREMENTS OF SEMEN CONTAINING NONMOTILE SPERMATOZOA.

Stallion	Time	Reading	Temperature	pH Value
		<i>Volt</i>	<i>°C.</i>	
Fifth.....	8.50	0.7280	19.5	7.49 ¹
Sixth.....	9.17	.7320	19.5	7.55 ¹
Seventh.....	9.07	.7280	22.5	7.55
Eighth.....	9.23	.7300	22.5	7.58
Thirteenth.....	9.47	.7480	22.5	7.76 ¹
Average.....				7.58

¹ Correction for CO₂-free water (—0.125 pH) has been deducted.

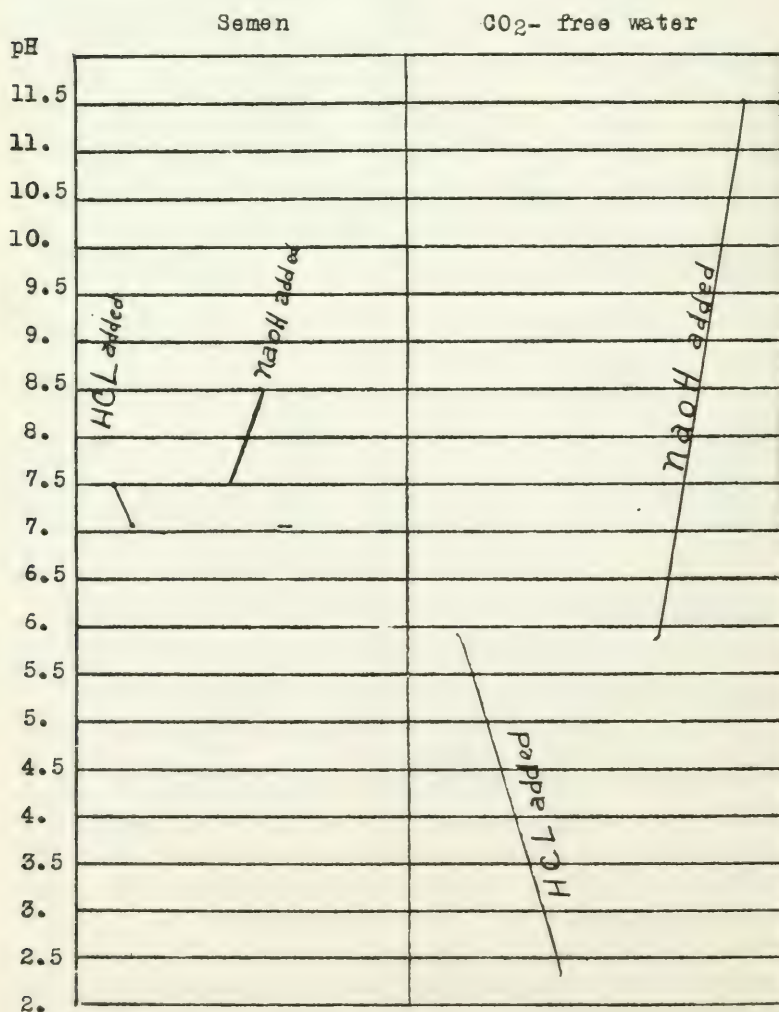


Fig. 1—Buffer Effect of Semen

of semen, of pH 7.56, 0.5 c.c. N. 10 HCl; and to another 10 c.c. portion, 0.5 c.c. N. 10 NaOH, and again measured the pH values. For comparison CO₂-free water was treated in a similar manner.

It appears from our measurements of the semen that a hydrogen ion concentration of pH 7.5 indicates a critical condition of the equilibrium of the electrolytes present in horse semen. Above this concentration the spermatozoa are active; below, they are inactive. A preliminary chemical analysis of portions of the above normal and abnormal semen gave the results shown in Table 6.

TABLE 6.—CHEMICAL ANALYSIS OF SEMEN.

Items	Per cent by weight	
	Normal	Abnormal
Total solids, dried at 105° C.....	2.38	3.49
Ash.....	0.78	0.60
Total nitrogen (N).....	0.241	0.366
Total phosphorus (P).....	0.017	0.028
Per cent ash in total solids.....	32.8	17.2
Per cent phosphorus in total solids.....	0.7	0.8
Per cent nitrogen in total solids.....	9.9	9.5

The proportion of total solids is distinctly larger in the abnormal semen than in the normal. The proportion of ash in the total solids of the abnormal semen, however, is markedly less than in the normal. The proportions of nitrogen and phosphorus in the total solids are sensibly the same in both.

SUMMARY

The average hydrogen ion concentration of normal horse semen was pH 7.31.

The average hydrogen ion concentration of horse semen in which the spermatozoa were inactive was pH 7.58.

The hydrogen ion concentration of horse semen is not readily altered.

It has been shown that without extensive equipment electro-metric measurements of hydrogen ion concentration afford a fair degree of accuracy.

DISCUSSION

DR. FITCH: I think too few of us realize how important this subject is with reference to the maintenance of life, and I think too few of us realize how much work has been done on this important secretion from the blood. I have been interested in the secretion myself for something over a year, and was surprised, in attempting to look over the literature, to find out how little had been done, how little information was available in regard to normal secretion. With ignorance of the normal secretion of course we can know but very little

of the abnormal condition. I found some work had been attempted by some Russians and some Italian physiologists about the time the war began, but since then we have had no further information. I just wanted to say a word in commendation of physiological research along this line, and hope that it may be extensive and that it may proceed, and that America may find some results that will lead to higher information. We don't doubt there may be some practical knowledge from this secretion that does affect sterility, that in many cases it is the male that is incriminated quite as much as the female. I repeat that I hope that the investigation will continue.

HORSE SITUATION

We all know there are stock market cycles and business cycles, but few of us realize that there are horse cycles as well. Experts of the Department of Agriculture are working out these horse cycles, and they have recently come to the conclusion reached by all far-seeing agricultural economists at the present time—namely, that the horse's day is just breaking. From now on we may expect increased attention to and increased profits from good horses. Horses are selling at exceedingly low prices. On June 15 horses were selling on the farms at an average price of \$98, compared with \$146 on June 15, 1913.

Farmers are recognizing the necessity of operating at lowest costs, and here and there are leaving their tractors and trucks in the lurch for horses. With horses selling at present prices trucks and tractors have difficulty in competing. The price of feed is away down. Here are comparative figures:

	May, 1913	Peak	May, 1921
Hay, per ton.....	\$10.42	\$24.85	\$13.08
Corn, per bu. ....	.57	1.97	.60
Oats, per bu. ....	.34	1.05	.37
Barley, per bu. ....	.48	1.70	.49

Many more horses would be in use today if more agricultural and weekly papers would push forward the facts. Certainly the tractor people are not going to do it. An unfortunate factor in the situation is the attempt by certain big car producers to make agents take a quota of tractors in order to get cars. Such coercion is wrong. The automobile has come to stay, but horses are no more evanescent than bicycles, of which latter vehicles more were sold in 1920 than ever before. Our advice to farmers is: Breed good work horses; they will sell for double present prices some day. To manufacturers and merchants we say: If you are using horses now, keep them; if you are using trucks, get some comparative cost figures on horses vs. trucks. They will surprise you.—*United Business Service.*

FIELD OBSERVATIONS IN LOCO POISONING ¹

By O. E. TROY

Raton, New Mexico

IN the preparation of a paper on this subject I make no claim of advanced knowledge, but I have chosen the subject because it is one regarding which we have accomplished nothing and I feel it a duty to bring the matter before the veterinary profession with an appeal that it receive more careful study, commensurate with the enormous loss sustained by the livestock industry over the entire Rocky Mountain slopes.

For the past seven years I have been in constant association with the condition commonly known as "loco," both from a professional standpoint and from that of a livestock producer, and I assure you that there is no pathologic condition with which I have ever contended that presents a more difficult aspect. As to its economic importance I venture to state that in districts infested with the white loco (*Oxytropis lamberti*) the loss far exceeds all other losses combined, and its toll is not confined to actual deaths or depreciation in value of livestock, but it constitutes an absolute bar against the importation of high-grade or purebred livestock. Native stock, especially of inferior quality, does not readily eat the loco weed, except under extreme circumstances, but the higher type of imported stock can not be grazed on loco-infested ranges with impunity.

For the consideration of this paper I confine myself to the white loco (*Oxytropis lamberti*). The purple or woolly loco (*Astragalus mollissimus*) is credited with being injurious, but is of relatively little importance. The symptoms of loco poisoning will become manifest in sheep between thirty and sixty days after they begin eating the weed and will be first noted by the herder when the individual separates from the herd, always seeking the rocky knolls in search of loco weed, the head up, nose extended, unmindful of the voice which it normally obeys. The gait becomes stiff, with marked lack of coordination. The eye develops a wild, staring glare. If continued grazing on loco pasture the animal soon refuses all other feed, strays from the herd and becomes food for coyotes or dies of malnutrition.

¹ Presented at the fifty-eighth annual meeting of the American Veterinary Medical Association, Denver, Colo., September 5-9, 1921.

The lesions found in animals suffering from loco poisoning are never such as could identify the disease. I will give here the complete autopsy on a sheep which showed symptoms of loco poisoning in February, 1921. As soon as symptoms developed it was removed from loco-infested pasture and kept in a small pasture until August 28, at which time it was destroyed for the purpose of autopsy. The animal showed typical symptoms of loco poisoning. The subcutaneous tissues were normal but entirely devoid of adipose tissues. The contents of the pleural cavities were normal in every respect. Those of the peritoneal were likewise normal. Careful search was made through the digestive tract for ulcers, which are reported to be lesions found indicating loco poisoning, but no ulcers could be located. General lack of adipose tissues was noted, although the animal had been on the best of pasture. The head was sawed through the median line so as to expose the brain tissue, which seemed normal in color and consistency, although the meningeal vessels indicated hyperemia. The spinal column was cut into sections, then severed lengthwise so as to expose the spinal cord throughout, which also seemed normal in color and consistency, though again I noted hyperemia. Other than this hyperemia I could note no lesions.

The symptoms of loco poisoning in cattle are more varied than in sheep. In fact, I have studied three distinct types of reaction to the loco poisoning. The symptoms apparently develop less rapidly than in sheep, but this may be due to the fact that they are not under constant observation. However, sixty days after cattle are noticed to prefer hilltops or rocky mesa sides on which the loco weed abounds will suffice to develop well-marked symptoms. They become gaunt from lack of water, as they will stay in a loco patch for days without drink. Constipation is marked, the gait stiff, with lack of coordination, and there is a wild, staring eye. They are intensely nervous and if startled by a sudden shout they tremble in a way painful to see. Many cases progress until they lose the senses of sight and hearing. I have watched advanced cases in a recumbent position that seemed to have hallucinations; willprehend and masticate imaginary food and will be entirely unaware of one's approach until touched.

The second train of symptoms are manifestly different. The drug must concentrate its effect upon the vasomotor instead of

motor nerves or ganglia, while the stiffness and lack of coordination are present in a milder degree, and instead of the tucked-up, gaunt appearance a distention of the abdomen is apparent, due to abdominal dropsy, which progresses until the animal becomes helpless and dies of suffocation or from a ruptured diaphragm. These cases can not be cured, but the simple operation of tapping, a trocar inserted through the linea alba about six inches anterior to the udder, will draw off the peritoneal fluid and give immediate relief. I have drained as much as eight gallons of fluid in this manner with excellent results, excepting in pregnant animals, where abortion invariably follows. These cases, if kept off the loco weed and given a ration of cottonseed cake, will make, to the casual observer, a complete recovery and the succeeding season will fatten remarkably.

Regarding the third train of symptoms, I feel that I am treading on "thin ice." I make my statements guardedly, with the hope that they will bring out full discussion and possibly lead to further study and investigation that will throw greater light on the subject. We have in the higher altitudes of New Mexico and Colorado a disease known as brisket disease, which seldom appears at an altitude less than 8,000 feet. The symptoms of this disease have a striking resemblance to those described above, except that the serum collects in the pleural cavity and pericardial sacs instead of in the peritoneal cavity. This disease appears with greatest frequency in animals taken into the mountains from lower altitudes and, in two cases which have come under my observation, from loco-infested ranges.

Dr. E. P. Johnson, of the New Mexico State College, has demonstrated that acute cases of this disease can be controlled by a judicious use of digitalin and if moved to a lower altitude will fatten and make marketable beef, although, like all other cases of loco poisoning, they never regain a normal, robust constitution.

The effect of loco poisoning on the horse is not of such great economic importance as it was formerly, owing to the rapid conversion of western ranges into farms and the fact that the horse's ration is more easily controlled, yet the loss from loco poisoning in the horse is enormous. Like the case of other species, the imported horse is more susceptible, but it is difficult to raise horses on loco-infested ranges without heavy loss. The loco-tainted colt is abnormally wild, seldom learns to lead, and

will never become reliable. If it continues to feed on loco weed the gait becomes stiff and faulty coordination develops. The sensitive nervous system becomes supersensitive, while the motor centers become slow to respond. The senses of hearing and sight are impaired and ultimately total blindness develops, deglutition becomes difficult and impossible. On the range the animal usually dies after falling between the rocks, in a ditch, or in shallow water where it drowns. If kept off the weed from early stages horses can be kept serviceable but never reliable.

The effect of advanced loco poisoning upon goats is one of the most pitiable sights I ever witnessed. Possibly because of their remarkable vitality they endure greater punishment and will follow the bunch when their front or hind quarters are completely paralyzed, dragging themselves in a sitting posture or walking apparently on the hind legs or head.

One of the great sources of loss from mild loco poisoning among cattle and sheep is that of abortion, and I deem it wise to caution veterinarians, and especially producers of contagious abortion vaccine, to beware of its use where loco poisoning exists, for it will not give desired results.

There is an opinion extant among investigators of loco poisoning that the condition does not consist of poisoning, but is rather a deficiency disease, or, as one investigator stated to me, "It is a condition which can be produced by feeding sawdust." I cannot agree with this conclusion. I am convinced that the weed contains a drug, a craving for which keeps the animal in search of it. I have driven animals off of loco pastures and endeavored to confine them in loco-free pastures, and I find that we can not build wire fences which are as strong as their desire for the weed, and we have had to resort to a corral in all advanced cases. Many ranges have been abandoned entirely on account of loco. Other persons have attempted to rid their ranges of the weed by digging, but the cost of this method, in my experience, is prohibitive. At present our only relief is obtained by range rotation. My observation convinces me that the loco weed develops its poisonous properties in greater quantities on high, rocky soils, mesa sides, etc., and I find that by using these soils when forage is abundant we can minimize our loss from loco. Toward the late winter and spring we endeavor to keep stock on the lower lands and bottoms. In partial support of my views on this subject I will quote the conclusions reached

by Dr. Law in his article on loco poisoning in "Veterinary Medicine," vol. 3:

1. There is some poison in loco weed which may cause the illness and if sufficient quantity is taken the death of an animal.
2. This poison is contained in the decoction obtained from the plants, and by systematically feeding it to healthy cats, cases of loco disease may be produced.
3. Taste for green loco weed may be experimentally produced in the jack rabbit.
4. From the large quantity of the plant or the decoction required to produce the disease, the poison must be weak; or if strong, it must be in a very small amount.

Since this article was published in 1905 the Department of Agriculture, in cooperation with the State of Colorado, conducted an extensive four-year experiment at Hugo, Colorado, the results of which were published in Bulletin 129 of the Bureau of Plant Industry, Department of Agriculture, in 1908. This bulletin is intensely interesting. It is the result of long, painstaking study, but the conclusions, which I will quote in part, have not been taken seriously by the profession, and if correct, have not been followed up by any logical method of cure or control which would make it of economic value. I quote in part from the introductory statement:

This discovery also seems likely to provide a basis for rational treatment of locoed stock. Unfortunately, the discovery of the fact that barium is the poisonous constituent of loco weeds came too late to aid in the search for remedial measures on the range during the period covered by this report, but those empirically arrived at have received additional support from these laboratory results. Thus the work in the field and undertaken after repeated attempts and discouraging failures by others has yielded results to persistent scientific research and promises practical aid to the now suffering livestock interests.

The livestock industry is still suffering. The above promise is as yet a promise.

The conclusions in Bulletin 129 I will quote in part:

1. Conditions analogous to those met with in locoed animals occur in other portions of the world, especially Australia.
2. The main symptoms described in stock on the range can be reproduced in rabbits by feeding extracts of certain loco plants. Those especially referred to here under the term of loco plants are *Astragalus mollissimus* and *Aragallus lamberti*.¹
3. The production of chronic symptoms in rabbits is a crucial test of the pharmacological activity of these plants.
4. The inorganic constituents, especially barium, are responsible for this action, at least in plants collected at Hugo, Colorado. Perhaps in other portions of the country other poisonous principles may be found.
5. A close analogy exists between the chemical symptoms and

¹ *Oxytropis lamberti*.

pathological findings in barium poisoning and those resulting from feeding extracts of certain loco plants. Small doses of barium salts may be administered to rabbits without apparent effect, but suddenly acute symptoms set in analogous to what is reported on the range.

6. The administration of sulphates, especially Epsom salts, to form insoluble barium sulphate, would be the chemical antidote which would be logically inferred from the laboratory work, but of necessity would have to be frequently administered, and its value after histological changes in the organs have occurred remains to be settled. At present it seems best to rely upon preventive measures rather than antidotal treatment.

7. Loco plants grown in certain soils are inactive pharmacologically and contain no barium. In drying certain loco plants the barium apparently is rendered insoluble so that it is not extracted by water but can easily be extracted by digestion with digestive ferments.

8. The barium to be harmful must be in such form as to be dissolved out by the digestion.

9. In deciding whether plants are poisonous it is desirable not merely to test aqueous or alcoholic extracts, but also the extracts obtained by digesting these plants with the ferments which occur in the gastro-intestinal tract.

It will be noted in paragraph 7 that these investigators have found that in some soils the loco weed does not contain a poison-our property. This conforms with my observation and is the basis of the plan we now follow to avoid loss from loco. However, nothing of value has thus far been developed from these investigations to afford the promised relief to the livestock industry. The investigators above referred to conclude that "we must rely upon preventive measures."¹ With this I heartily agree. I will, therefore, briefly review the history of loco poisoning from the observations of stockmen and present a plan that may prove a feasible method of prevention.

The loco weed is infested in some localities with a parasite, a larval form of fly, which the early observers believed to be the cause of the poisoning, arguing that the parasite was eaten with the weed and contained the poison. I have been informed by three observers in widely separate areas that the infestation of this parasite destroys the loco weed. One observer who made an effort to destroy the loco weed in an 8,000-acre pasture by digging informed me that he found this parasite present on a part of his range. He purposely left an area of 10 acres to ascertain the result. This plot was marked by stakes and an estimate made of the number of loco plants. He informs me that after the second year the loco weed had entirely disappeared and that the area is still free. According to the best information I am able to collect, this fly deposits its eggs in the base of the loco

¹ A later publication of the Department of Agriculture, Farmers' Bulletin 1051, discusses preventive measures.—EDITOR.

plant, the larva burrows into the plant and destroys the root. I was unable in the limited time at my disposal to obtain specimens of either the fly or the larva to present here, but I believe the idea worthy of further study, for it may develop a feasible method of prevention for loco poisoning.

The digging of the loco weed is our only alternative.¹ If this method is adopted it must be carried out for at least three, and better, five years. I have figures which indicate this can be done at an expense of 25 cents an acre per annum, but my experience differs. There is on the market a chemical known as "Loco Lion" which is sold to destroy loco weed. This product must be injected into the base of each plant, and, according to one experiment upon which I have data, it is very efficient, at a cost of 40 cents an acre and labor. To be ultimately successful the problem of eradicating loco weed must be coordinated by the Government on a plan similar to that of the Biologic Survey in its rodent extermination campaign, in order to clear the range over large areas and prevent reseeding.

In conclusion, I respectfully recommend that this matter be taken up by the proper committee to put the available data in concrete form and present at the next meeting recommendations for the approval of this Association, with the view of requesting some line of action of the United States Department of Agriculture which will provide relief to the suffering livestock industry.

GEORGE M. ROMMEL RESIGNS

George M. Rommel, chief of the Animal Husbandry Division of the Bureau of Animal Industry, who has been with the United States Department of Agriculture for 20 years, has resigned to become editor of an agricultural magazine.

Mr. Rommel built up the Animal Husbandry Division and had done distinguished and effective work that is recognized throughout the country as well as in the department. A native of Iowa, he is a graduate of the agricultural school of the Iowa State College at Ames. He is the author of various bulletins and articles on animal husbandry topics, a fellow of the American Association for the Advancement of Science, and secretary of the American Genetic Association.

¹ Farmers' Bulletin 1054 recommends severing the root below the crown of buds and states that it is not necessary to dig out the whole root.—EDITOR.

THE NEED OF COOPERATION BETWEEN THE UNITED STATES AND MEXICO FOR THE CONTROL OF EPIZOOTICS ¹

By L. SANTA MARIA

Veterinary Inspector, Department of Public Health of the Republic of Mexico, Piedras Negras, Mexico

IT IS with great difficulty that I undertake to prepare a paper in the English language, as I lack experience in its use; but I undertake to do so feeling sure that you will pardon mistakes which are unavoidable.

Before entering into my subject I will take this opportunity to assure you that I bring the most cordial greetings from the veterinarians of Mexico to the members of this Association. The veterinarians of Mexico are fully aware of the great advances made in veterinary science by the members of the profession in the United States. We have watched them in their successful efforts in the control of infectious diseases of animals; we are acquainted with the wisdom of your laws relating to the movement of livestock, the regulations governing the inspection of meat, milk and other articles of food, the organization of your Army veterinary service, your enormous progress in biologic therapy, etc. The names of the leading veterinarians in this country are familiar to us, and we have obtained and used to our great advantage their books and articles.

Cordial relations between the veterinarians of our countries have never been initiated, on account of the revolutionary conditions which have kept our country in a turmoil of successive bad governments, which have prevented all constructive progress. By good fortune, Mexico has at present a strong, honorable government, in the leadership of which we have General Obregon, a man of energy, honor and good intentions, who has been able to establish peace and to give new life to the wheels of industry by providing full protection of life and capital to both the native and the foreigner.

As a citizen of Mexico, a country desiring the friendship of the United States, in spite of the statements to the contrary by

¹ Presented at the fifty-eighth annual meeting of the American Veterinary Medical Association, Denver, Colo., September 5-9, 1921.

certain sections of the press of this country; as a veterinarian of Mexico, and as a representative of the Department of Public Health of Mexico, I wish to express my best wishes for the progress of this Association, and urge a more sympathetic understanding on which to build for our mutual benefit.

It is a well known fact that the transportation of livestock from one locality to another, or some of their products like hides, horse hair, bones, etc., constitutes one of the most frequent and dangerous causes of epizootic disease propagation in livestock. There is not one veterinarian that has not had the opportunity of seeing some cases of infectious and contagious diseases which have developed in some locality coinciding with the arrival of livestock from other localities. Epizootic diseases are of daily occurrence in livestock shows, fairs and expositions. In this way we could cite a multitude of examples to demonstrate the truth of what I have said.

The sanitary authorities of the civilized countries have always understood these facts clearly, and to that effect they have dictated a series of laws tending to regulate the transportation of livestock, thereby eliminating a serious danger. The sanitary departments of the different States of the Union of America have in this respect a great many sanitary laws which, without doubt, are the most complete of their kind. I wish to express my admiration for such laws, of which the United States should be proud.

Contrary to what is supposed, the international interchange of livestock between the United States and Mexico has not been given its due importance from the sanitary point of view. The geographical location of the two countries makes possible between them a development of an active commercial interchange of all kinds of articles, livestock not excepted. Such interchange will be increased as a natural result of greater activities; therefore this is a good opportunity to point out the necessity of initiating measures to make more efficient the sanitary inspection of animals and their products not elaborated in the border of the United States and Mexico, an inspection which up to date has not been as strict as it should be.

For example, I have seen hundreds of freight cars, loaded with hides, crossing the boundary to be interned in the United States, the origin of which nobody knew, and that perhaps came from regions infected by anthrax or by some other contagious

disease, without any more requirement than a statement from the merchant before the American consul that the hides came from regions which were not infected by any infectious or contagious disease. It is easy to understand that such a requirement is useless, because in the majority of cases the interested party in this line of business has not the least idea of what he is stating, doing it only to obtain the permit he is after, without knowing the great danger such a statement engenders in this class of affairs. In such case the veterinary inspectors of the Mexican Government could have given good service by demanding information in detail, and when that was not obtainable, by arranging under their vigilance the disinfection of the hides. Never have they been asked for their cooperation in such a way.

In the same way I have known of animals that have been declared tuberculous in the United States and have been sent into Mexico by some unscrupulous individuals taking advantage of the fact that some places on the Mexican border are in need of veterinary inspectors, or defying criminally the vigilance of the authorities. In cases like this the American authorities would have helped greatly by prohibiting the exportation of such animals.

To the high criterion of this assembly I have undoubtedly referred sufficient cases to understand the imperious necessity of correcting such deficiencies, which can be brought about only by an understanding between the sanitary authorities of the United States and Mexico. The understanding, if realized, would be beneficial. It would eliminate such dangerous causes of contagious disease propagation, and greatly facilitate its control.

It would be very difficult for me to submit to you any set of rules, which necessarily will have to be formed if an understanding is to be reached between the two countries. Neither do I consider this an opportune time to discuss such a document. I wish, nevertheless, to point out very briefly a few things which, owing to my experience as veterinary inspector on the border, I think should be taken up first.

It would first of all be indispensable to establish that every person or corporation desiring to export livestock or their products from Mexico or the United States should be required to secure a permit or health certificate from the sanitary authorities. It would then be possible to prevent the transpor-

tation of livestock or their products from districts in which infectious diseases exist. It would be possible to impose a multitude of highly beneficial measures, such as prohibiting all classes of commercial interchange of animals that have been declared tuberculous; to require that all bovine animals intended for breeding when proceeding from a tick-infested zone, should be dipped previously in an arsenical solution; to arrange that hogs before being transported should be vaccinated against hog cholera, and other things that will contribute to lessening the danger, from the hygienic point of view, of the transportation of animals.

To my knowledge, the carrying out of such measures as I have briefly mentioned will result beneficially to the livestock industry and to those who are interested in it. When the interested parties in this line of business of Mexico, as well as those of the United States, are convinced that the interchange of animals or their products does not offer any danger from the sanitary point of view, because it is subjected to a rigid scientific examination, they will increase it. It would be useless to try to demonstrate all the advantages that will come with this intensification of commercial activities. It presents to the doctors of veterinary medicine a new opportunity to realize a work of positive utility. I am sure that I have made myself understood, although my paper is a little confusing, and if my propositions are taken into consideration and practiced we will have contributed to the already existing idea in society that the mission that has been recommended to us professionally is transcendental.

It may be of further interest to this Association to know that during the months of May, June and July, 1921, approximately 38,000 head of cattle, goats, sheep and hogs crossed the international boundary at Eagle Pass, Texas, into Mexico, this being the third in size of entries into Mexico from the United States.

As a heritage of the war, dourine has appeared in Belgium and in the northeastern part of France, where it is said to have been introduced by German army horses. A recent Belgian official report states that the disease has been found in 4 stallions and 88 mares and that 277 other animals are suspected of being infected.

COOPERATION IN THE ERADICATION OF TUBERCULOSIS ¹

By H. R. SMITH

*Live Stock Commissioner, National Live Stock Exchange,
Chicago, Illinois*

THE INCREASE in the prevalence of bovine tuberculosis throughout the United States during recent years is a matter of grave concern. According to the records of the Department of Agriculture, a total of 35,113,077 hogs were slaughtered under Federal meat inspection during the fiscal year 1908, of which number 719,279, or 2 per cent, were "retained" for tuberculosis. Since 1908 the percentage found to be infected with this disease has increased an average of nearly 1 per cent each year. Of the 37,700,000 hogs slaughtered under Federal inspection during the fiscal year ending June 30, 1921, 12.5 per cent were retained for tuberculosis. It is reasonable to assume that the 40 per cent of the hogs of this country not slaughtered under Federal inspection are equally affected, and we are safe in saying that on the average one out of every eight hogs in the United States has tuberculosis.

Fortunately, hogs are for the most part killed young, before the disease has become generalized, and but 1 per cent of the total killed are wholly condemned for grease or sterilization. At the Chicago market alone the loss last year was 54,325 hogs, a train load of 30 cars per week nearly worthless. Moreover, as a large portion of the heads are condemned when the carcass passes inspection, the loss is only partially indicated by the number sterilized and condemned.

Dr. Schroeder of the United States Bureau of Animal Industry estimates that at least 95 per cent of the tuberculosis in hogs comes from cattle. Since 1917, when the nation-wide campaign for the eradication of tuberculosis in cattle was organized, there has been a material reduction in the percentage of cattle retained for tuberculosis at our market centers—approximately one-sixth less now than then. On the contrary, the percentage of hogs retained was 9.8 per cent in 1917 and 12.5 per

¹ Presented at the fifty-eighth annual meeting of the American Veterinary Medical Association, Denver, Colo., September 5-9, 1921.

cent in 1921, or one-fourth more. This cannot be explained by the fact that much more milk was sent to condenseries during our participation in the World War. The increase in the prevalence of tuberculosis among hogs was even greater preceding that period.

I have wondered if the appalling conditions with respect to the great increase of tuberculosis among poultry during recent years may not be largely responsible for the higher percentage of hogs retained for this disease. Many chickens are now dying from tuberculosis, and these are very commonly eaten by hogs. While avian tuberculosis may be less readily transmitted to hogs and does not produce generalized cases, it does cause localized lesions, as stated in the final report of the Royal Commission of Great Britain appointed to inquire into the relations of human and animal tuberculosis. Cultures taken from 59 pigs showed that 50 were of the bovine type, 3 human, 5 avian, and one mixed avian and bovine. Nine of the generalized cases of tuberculosis in these pigs showed the avian type except one which was mixed avian and bovine. Whether or not poultry is responsible for much of the tuberculosis in hogs, the fact that so many chickens are dying from this disease would seem to warrant the making of some systematic effort to reduce it in poultry.

The organization of our Federal and State accredited herd plan for testing cattle has been remarkable considering the short time in which it has been done. The success of this great American enterprise has been watched by sanitarians of other nations and they have marveled at the results thus far accomplished. We now have over 80,000 herds of cattle under Federal and State supervision, 60,000 that have passed one clean test, and nearly 10,000 fully accredited. This is a wonderful showing for the three-year initial period. It has been made possible through the splendid co-operation of breeders, veterinarians, market men, members of Congress and State legislators, with the intelligent leadership of the United States Bureau of Animal Industry. However, we have made but a relatively small beginning in a tremendous undertaking. If we are to hold this menace in check and eventually eliminate it, still greater efforts must be put forth in the future. Starting with a Congressional appropriation of \$500,000 three years ago, we now have \$2,000,000. State funds for tuberculosis eradication

totaled less than a half million four years ago. We have now State funds amounting to \$4,000,000 for one year's work. Notwithstanding this great increase in Federal and State appropriations, the demand for the testing far exceeds the means by which it can be done. Two months of this fiscal year are gone, and some States have already found it necessary to put on the brakes because of fast-depleting Federal or State funds. The Federal indemnity apportionment will be exhausted first because the States have exceeded the Federal appropriations. Fortunately, Congress will be in session, and there is reason to believe that in view of the importance of this work a willingness will again be shown to grant an emergency appropriation, especially when the members of Congress hear from their constituents on this subject. It is a gross waste of our national wealth to permit an annual loss of thirty millions of dollars when an expenditure of ten millions each year will in a short time eliminate 95 per cent of this burden to our nation.

Of infinitely greater importance is the fact that the elimination of tuberculosis in cattle may reduce human tuberculosis 50 per cent. It would be a crime not to permit this work to go forward still more rapidly. There is a strong disposition on the part of Congress to economize on public expenditures, which is a very commendable thing; but if intelligent consideration is given to these numerous requests and if the wishes of the people are heeded, a liberal increase in the appropriation for tuberculosis eradication will be granted.

In this connection I wish to say that the members of Congress are more disposed to grant appropriations for indemnity than for salaries. If the work of eradication is to grow in keeping with popular demands, the counties must assume a share of the operating expense. Many counties have already raised funds for the employment of veterinarians whose work will be supervised by Federal and State officials. This is a most favorable indication. It means thorough work with the county as a unit, and it means the beginning of the end of tuberculosis in the counties which undertake it. With the intrademic test, area work preceded by an educational campaign is giving remarkable results. The success of this work is very largely a matter of education. When the people understand the importance of tuberculosis eradication and the simple methods by which results can be accomplished, they invariably want their herds

tested and the reactors properly disposed of. The county agents are now taking a keen interest in this subject, and they are in a position to create public sentiment that will make the enterprise succeed in any community. The boards of supervisors in four Michigan counties—Hillsdale, Livingston, Jackson and Wayne—have appropriated sums ranging from \$3,000 to \$5,000 each for county co-operation in the eradication of tuberculosis. The farm bureaus of seven counties in Illinois have guaranteed funds for this purpose, supplemented in some instances by county appropriations. Iowa county boards have no authority to make such appropriations, but the farm bureaus of Winnebago and Shelby counties have each recently guaranteed \$4,000 for the employment of veterinarians for testing herds, this sum in the former county to be raised by a charge of 25 cents per head on each animal tested. The herds of four counties in Wisconsin—Barron, Lincoln, Door and Waukesha—have been nearly all tested, and the work has been started in other counties. The farm bureaus in a large number of counties in New York and Nebraska have financed this work, which is already giving excellent results.

Public opinion is our greatest power, and whenever the people of any community are aroused to the importance of an undertaking and are willing to support it financially and otherwise, the problem is solved. This is particularly true of a condition that menaces human health. At Paris, Ill., where recently the five children which drank milk from a tuberculous cow in the Kelly family of seven contracted tuberculosis, every owner now wishes his herd tested, and the veterinarians employed by Edgar County tested all of the breeding cattle in the first township in three weeks. The film "Out of the Shadows," which pictorially describes a similar case that came under the observation of Dr. Gibson, a Federal inspector, is a wonderful help in bringing this subject to the attention of the people of any community. We have four of these reels in constant use by county agents and have also loaned a portable moving-picture machine that can be used in any church, schoolhouse or outdoor meeting by use of a storage-battery or electric lighting system. Just as soon as the people of any county vote money for an enterprise of this kind you may be assured that the representatives of such counties in Congress and in the State legislatures will favor adequate appropriations. With such

support and with the whole-hearted co-operation of farmers, breeders, Federal and State veterinarians, private practitioners, market men and others we may expect still greater results in the next four years. The National Live Stock Exchange and member exchanges, in full realization of the importance of this great undertaking, have recently gone on record as favoring aggressive work in the eradication of tuberculosis, and they will give you, whose efforts are greatly appreciated, every possible assistance leading to the success of the enterprise.

MANY CATTLE BREEDERS WANT TO HAVE HERDS ACCREDITED

The work of ridding the country of bovine tuberculosis through the accredited-herd system, which is based upon Federal supervision, and the issuance of certificates by the U. S. Department of Agriculture, is making steady progress throughout the country. The State of Minnesota has been leading for some time in the number of fully accredited herds and the number of cattle certified free of the disease, but the report for September shows that the lead has gone to Wisconsin. The latter State now has 1,309 accredited herds, containing 29,001 head of cattle. Minnesota has 1,171 accredited herds, with 28,089 cattle.

The total number of herds accredited in the United States is 9,963. The number of cattle in the country certified free of the disease is 230,704. There are 71,999 herds and 848,244 head of cattle that have been tested once and, presumably, will subsequently be on the accredited list. There are 1,546,814 cattle in 103,046 herds now under Federal supervision.

The demand for inspections and tests under this tuberculosis clean-up plan is so great that the inspectors can not keep up. At present there are 15,671 herds on the waiting list. These herds contain nearly a quarter of a million cattle. During September 163,742 cattle were tested in the various States. Of these, 6,093, or 3.7 per cent, reacted.

“A very hot bath will often destroy the germs of influenza,” states a weekly journal. The difficulty, of course, is to persuade them to have one.—*London Punch*.

THE VETERINARIAN AND THE PUBLIC ¹

By A. N. CARROLL

Pueblo, Colo.

THE VETERINARY PROFESSION today is occupying a position in the eyes of the public far beyond the fondest hopes of some few decades ago. With the increased confidence and respect shown the profession come many new and complicated problems and the necessity for our higher attainment individually and collectively.

There are certain definite facts recorded in which we are legally responsible to our clients. There are far more vital obligations to which we are morally responsible to ourselves and the public, if we are to advance as we now have the opportunity. The public is daily expecting more from the profession, and it is essential that we arise to these possibilities.

Our advancement is in direct ratio to increased confidence by the public in every individual among us, but more especially of our activities as an Association. Individually our efforts are too often lost, but collectively they are intensified and perpetuated, exerting an influence a hundredfold more than each by itself. A half dozen men bonded together can exert far more influence than a half hundred without team work.

We are living in the day of organization, which is manifested in every walk of life. The old adage that competition is the life of trade is obsolete. The present-day organization is regulating competition within itself and universally working to the advantage of the group, eliminating internal friction and by a united effort developing not only the whole but the units as well. Modern competition within a profession no longer means a state of war with victory manifested upon defeat of the contemporary, but a broader view, bonding the individual to a mutual helpfulness, strengthening his fortifications by developing his profession, that he himself may have the approval of public opinion in relation to other professions.

Much has been accomplished by this Association in the past, but much more is demanded of it in the future in shaping the

¹ Presented at the fifty-eighth annual meeting of the American Veterinary Medical Association, Denver, Colo., September 5-9, 1921.

course and leading the way to our progress. It has never, however, accomplished what it could have with a stronger organization working with a united thought, eliminating jealousies and destructive competition between individuals and above all between groups within our Association.

Why have we continued fighting among individuals, when by lessening the estimation of the other by the public, we lessen the estimation of the profession of which we are a part, and for which we suffer? Why have we failed to develop a proper good-fellowship among the different sections of our organization, so necessary to harmony? Each one has its course to pursue with the utmost credit to itself, but forever with the broader view of advancing the profession as a whole. What we need is not less of some sections, but more of all sections.

We, like other professions, are gradually specializing, which will call for further subdivision of classifications; but no matter how specific, they are all co-relative, one upon the other. In the same sense, all State associations should be part of our National Association, having official representation within, and all working as one unit with a common view.

We must devote more of our time to putting the house in order, getting into the game without further delay, that we will not be discriminated against by stronger influences. Many branches of our profession are looked upon favorably by other interests, and we stand to lose, unless we awaken, for they are better organized. At present the public is with us, and our organization can not fail, except from within, for we are founded upon correct principles, that of our own advancement without hindrance to others. We are constructive and not destructive. The stronger we become individually and collectively, the greater good we accomplish.

So let us all put our shoulder to the wheel, enlisting the support of every one, eliminating all obstacles from within, and develop a unity capable of attaining our objectives.

When we have unity within ourselves, and labor with unselfish energy for us all, no one in particular, but every one in general, we will be coming into our own, convincing the public of what we desire, and they willing to concede to the veterinarian.

MUNICIPAL FOOD INSPECTION ¹

By GEORGE H. GLOVER

*Dean, Veterinary Department, State Agricultural College, Fort
Collins, Colorado*

THERE APPEARS to be a growing interest in municipal food inspection. This interest is more generally apparent with the citizenry than it is with the veterinary profession. Relatively speaking, public health is no less important in the small cities and towns than it is in the large cities, and should be equally safeguarded.

There is little need of presenting arguments to you men in favor of municipal food inspection, and this I shall not attempt to do further than to make a few general observations. The fact of its need is generally admitted, but apathy stifles concerted action, and nothing is done. Public sentiment has long since been created in favor of a pure water supply, and it is considered the thing of first importance in municipal affairs. As inconsistent as it may seem, yet the fact remains, that the public is much more concerned about what it shall drink than it is about what it shall eat. From both an esthetic and a public health standpoint, there is no just ground for such discrimination. Measures that safeguard health should invariably receive first consideration. Paved streets, a public library and electric lights represent conveniences that can not be gainsaid, but nevertheless should always be secondary in consideration to public health measures. We can have just as many public conveniences as the taxpayers will stand for, and it is also true that we can have as much public health as we are willing to pay for.

Granting that municipal food inspection is desirable, then its practicability constitutes the main question for argument. I shall contend that it is feasible for towns ranging in population from 1,000 to 10,000 as well as for the larger cities.

Federal and State authorities are without jurisdiction, save in a very general way. Local conditions are so variable that the use of a standard ordinance is impossible. Each city or town

¹ Presented at the fifty-eighth annual meeting of the American Veterinary Medical Association, Denver, Colo., September 5-9, 1921.

must work out its own problem. There are really no insurmountable difficulties to overcome when the people are made to appreciate the importance of an equal and adequate supervision of both the food and water supply.

The veterinarian, because of his training, is the logical person to serve as food inspector, and if inspection is to be inaugurated in the small cities and towns, he apparently is the one that must assume leadership. This he naturally hesitates to do, for his efforts are liable to be attributed to selfish motives, and there is usually little promise of substantial financial returns for his efforts. His work as inspector would necessarily interfere somewhat with his practice and might create some enemies. However, we have a parallel case in the city and county physicians, and with them these objections are found to have small significance.

The success or failure of an enterprise of this kind, after it has once been started, depends much upon the judgment and tact of the inspector. It seems reasonable that a veterinarian as food inspector might grow in popularity and enjoy a commensurate financial return from his practice.

Municipal food inspection should be conducted as an educational propaganda, seeking cooperation in making conditions better. Ideal conditions can never be obtained, and the best that can be hoped for is a marked improvement from month to month. A too vigorous use of authority invariably creates an opposition that stifles cooperation and may be fatal to the enterprise. Utopia can not be reached by one jump. In this respect food inspection differs from some other things, such, for instance, as regulating automobile traffic on the streets. The most grievous violations of the ordinance should be corrected at once, but improved methods are matters of education and habit. You can no more legislate a dirty dairyman to be cleanly in his habits than you can legislate a sinner into godliness.

There is another aspect of this question which should be emphasized. The veterinary medical profession must broaden its scope of usefulness. It must do more or it will be required to do less. Municipal food inspection provides a larger opportunity for public service. Upon final analysis, service is inevitably the standard of a just appreciation as well as an adequate remuneration. The work of the veterinary profession consists

essentially in conservation of the animal wealth and as guardian of the public health. We must admit that up to this time our efforts in guarding the public health have not been especially conspicuous.

In every department of human activity the law of supply and demand operates impartially and unceasingly. The demand is determined by the supply and the need for that particular kind of service. The supply depends upon many factors, including remuneration. The most important factor in remuneration is the quality of service rendered. There is a difference between earning a living and getting a living. If the veterinarian is to sell his services profitably he must make them not merely passively appreciated but they must be made very necessary to the community. His motto should be "How can I best serve my community?" and not "How much is there in it?" "The laborer is worthy of his hire," but the one who is most concerned about the amount of his wage is shortest on the job. The spirit of commercialism seems to dominate most things these days and the learned professions have not escaped its blighting influence. Good citizenship has its responsibilities which are public as well as private. Our observation has been that the veterinarian who takes an interest in public enterprises, such as the county fair, the commercial club, public health problems, is the one who usually makes his location permanent and who finds his profession worth while.

The detail of food inspection can be worked out in any town that is large enough to support a veterinary practitioner. There are no obstacles that can not be surmounted; the most formidable is a dormant public interest. Here is an opportunity for a larger field of usefulness, and every veterinarian is urged to take the matter under advisement.

Having been in charge of food inspection in the City of Fort Collins for more than fourteen years, the writer feels warranted in speaking with a certain degree of assurance. This work, taken on as an avocation, has been interesting. Experimentally, financially, professionally, and as a public health measure, it has been much worth while. The real problem in all cases is how to get the work started. In Fort Collins the first step was a membership in the Chamber of Commerce. The subject was presented in a brief address before the Chamber of Commerce and the women's clubs, where favorable resolutions were sought

and obtained. A conference with the meat men, dairymen and city council was arranged. An opposition arose, as was to be expected, but it proved not to be formidable. A tentative ordinance was presented, which was redrafted by the city attorney, and after some delay received favorable action.

The first ordinance provided for license fees which were presumed to cover the expense of inspection. It provided for the employment of an inspector, who should be a qualified veterinarian and receive a salary of \$75 per month. If looked at from a purely mercenary standpoint, the salary offered was wholly inadequate, considering the manifold duties provided for in the ordinance. However, it was an opportunity; it was getting the work started.

Supervision of foods of all kinds came under the provision of this act. There were two questionable abattoirs and several dealers who made a business of slaughtering more or less decrepit animals in the country and supplying the city markets with dressed meats.

The first tuberculin test of cows in the milk supply of the city revealed about 7 per cent of reactors. During the first year of inspection over a ton of meats was condemned on the average each month. At this time about 80 per cent of meats consumed in the city were slaughtered locally. Now the ratio is reversed and approximately 80 per cent of meats sold over the block is imported, bearing the Government stamp of inspection.

After fourteen years of testing, and the slaughter of reactors, tuberculosis has been practically eliminated from the dairies and the private cows of the city. No reactors were found on the annual test which has just been completed. Commensurate with this has been the reduction in condemnations for all diseases, including tuberculosis, at the city abattoirs. No tuberculous lesions have been found during the last twelve months, save in one shipment from Denver. All license fees have been abolished. It was considered that food inspection is for the benefit of all the people and should be paid for out of the public treasury. The food inspector and his deputy do practically all of testing of cows and of milk without extra charge. The intradermal test is used with various combination of tests on suspicious cases.

The dairies, meat markets and provision houses are visited

at uncertain intervals and the slaughterhouses once a day. For this service the city now pays \$115 per month. If one is to consider nothing but the salary, the remuneration is small indeed. However, when looked upon as an avocation, as an adjunct to an established practice or salaried position, it is not to be ignored. Furthermore, the time devoted to inspection scarcely exceeds an average of two hours a day. With the additional income from food inspection, many places that now can not support a veterinarian would be able to do so, and the community would enjoy the benefits of both inspection and a trained veterinarian.

Supervision of foods will eventually be extended to all cities, large or small, and to a certain extent to the rural districts. Public health is paramount. It is simply a matter of rousing the public from its lethargy and creating the right sentiment. It is a work that the veterinary profession can appropriately sponsor and support with its every effort.

MEXICAN REPRESENTATIVES IN FORT WORTH

Special representatives of President Obregon of Mexico, who are in Texas studying the live stock conditions, were guests of the Bureau of Animal Industry and Live Stock Sanitary Commission in October.

Dr. Carlos Pavia, head of the veterinary college in Mexico City, and Samuel Torres Elorduy, famous hydraulic and agricultural engineer of Mexico, were highly pleased with the manner in which the cattle and other live stock are handled at the Fort Worth stockyards.

Elorduy, who has spent much time in the United States studying conditions, and who, with Dr. Pavia, is in the State in the interest of the Mexican department of agriculture, declared that Fort Worth has one of the most splendid systems of handling cattle that they have seen.

Mexico intends starting a vigorous campaign toward tick eradication next year, and Dr. Pavia will leave for Washington as soon as the Dallas fair is over to consult with higher officials in the Bureau of Animal Industry in further details of this branch of work, which is new in the sister republic.

CLINICAL AND CASE REPORTS

(Practitioners and others are invited to contribute to this department reports of unusual and interesting cases which may be helpful to others in the profession.)

ANTHRAX IN TWO DOGS, TREATED WITH SERUM

By CHARLES V. NOBACK

Laboratory of Hygiene, Bogota, Colombia

A NATIVE had a cow which he kept for his family use. He took such care of her as to be very careful of the water she drank, giving her water from a reservoir instead of allowing her to drink from the common brook. She was pastured on land near the owner's house. One day during the dry season the cow and her calf were taken to another pasture, which lies in a valley receiving the waste water of a small town and an abattoir and is known to be contaminated with anthrax.

History.—On Saturday, February 19, 1921, about ten days after being on the new pasture, the cow suddenly gave less milk than usual, dropping from 12 quarts daily to less than 6, at the same time refusing to eat or drink. The next day at 4 o'clock in the morning she had a painful attack of colic with tenesmus, passing some soft feces and blood. At 5 o'clock the same morning the animal died very suddenly without struggling. The carcass was left on the ground until the next day, when a local native practitioner was called to make an autopsy. According to the owner, the carcass was greatly swollen, anus protruding and congested, with black, tarry blood exuding from the anus, eyes and nose. The carcass was unnecessarily opened, two dogs and a kitten eating some of the blood and meat. Four days later the owner came to the veterinary clinic with the dogs for treatment, giving the foregoing history.

Symptoms and Treatment.—The dogs appeared as if they had been inflated with air. There was a marked edematous swelling over the entire body, especially over the submaxillary, pharyngeal and brisket regions, together with a stomatitis and swelling of the mucous membranes of the mouth. The swelling was soft and doughy on pressure, characteristic of anthrax. The temperatures were 41° and 40° C. respectively. The dogs were

of a fox terrier type. One was white and the other black and brown. The white one was very weak, with respirations increased, eyes congested, hardly able to walk, and seemed about ready to die. At half past eight in the morning each dog was given 20 mils of anthrax serum subcutaneously. They were quarantined and kept under observation. During the afternoon they seemed a little better; nevertheless each was given 30 mils of serum again at half past four. The temperatures and other developments are shown in the accompanying tables.

TABLE 1.—WHITE DOG.

Date 1921	Temperature (Centigrade)			Remarks
	9 a.m.	12 m.	6 p.m.	
Feb. 25	41.0	40.6	40.0	20 mils serum at 8 a.m. 30 mils serum at 4:30 p.m.
26	39.5	40.0	39.5	Polyuria.
27	38.8	39.4	39.9	Polyuria.
28	39.5	39.8	39.6	Marked increase in edema; difficulty in respiration; very weak. Thinking that animal might die, administered 50 mils of serum subcutaneously at 6:30 p.m.
Mar. 1	40.5	40.0	39.5	Difficulty in swallowing.
2	39.5	39.0	38.5	Seems easier.
3	38.8	38.0	37.6	Edema much reduced; eats better.
4	38.9	38.0	37.6	Apparently well; facial expression normal.

The polyuria was very likely due to the edema.

TABLE 2.—BLACK AND BROWN DOG.

Date 1921	Temperature (Centigrade)			Remarks
	9 a.m.	12 m.	6 p.m.	
Feb. 25	40.6	40.0	40.2	20 mils serum at 8:30 a.m. 30 mils serum at 4:30 p.m.
26	39.0	39.0	39.0	Swelling reduced. Chews food well and swallows more easily.
27	38.5	38.4	38.5	
28	38.2	38.5	38.4	
Mar. 1	38.0	38.3	38.5	Apparently well. Discharged.
2	38.0	38.2	38.0	
3	38.0	38.0	38.2	
4	38.2	38.2	38.0	

The diet during the course of treatment consisted of milk in the morning, a little meat broth at noon, a few scraps of meat in the afternoon, with all the water they desired.

The avenue of infection was apparently through the abraded mucous membranes of the mouth, since the lesions were of the pharyngeal type and no digestive disturbances were present. The feces were normal, no blood being present.

It seems apparent that the white dog would have died if he had not been treated with serum. In the case of the black and



Fig. 1.—White Dog Affected with Anthrax



Fig. 2.—Black and Brown Dog Affected with Anthrax

brown dog there is the possibility that he might have recovered spontaneously, because he was not so severely affected as the white one.

At the same time that the dogs were brought to the clinic for treatment the owner mentioned that a kitten two months old also ate some of the meat with the dogs. The kitten died the same morning that the dogs were brought for treatment. On request the owner brought the dead kitten to the veterinary clinic for autopsy. The following was found: Eyes open; abdomen slightly distended; black, tarry blood oozing from the nose, mouth and anus. On opening, the lungs were found to

be congested and dark, spleen enlarged, intestines congested and dark. Under aseptic precautions some of the heart blood was withdrawn in a sterile pipette, and on microscopic examination motile rods resembling anthrax bacilli were seen. An agar slant was made, which gave the characteristic anthrax growth, a waxy, spreading growth. A guinea-pig was inoculated and died two days later (36 hours) of typical anthrax.

SOME PARASITES FOUND IN SHEEP ON THE SABANA OF BOGOTA

By CHARLES V. NOBACK

Laboratory of Hygiene, Bogota, Colombia

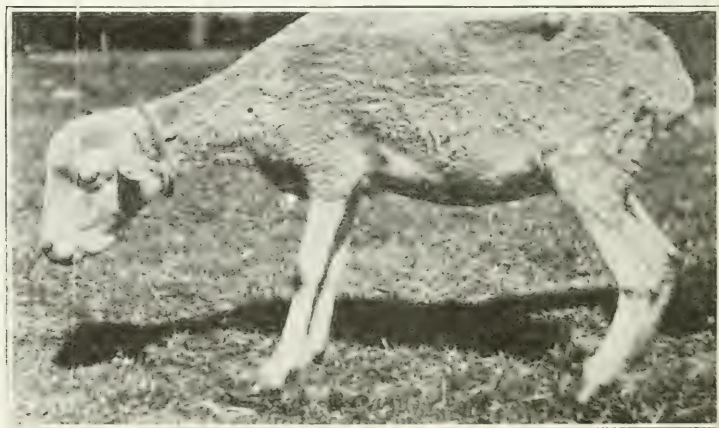
THE Sabana of Bogotá is situated in the Eastern Cordilleras of the Andes Mountains and is about 100 miles long by 30 to 60 miles wide. It is connected by mountain passes with other sabanas in this mountain chain. Like other sabanas in this region, it is a mature valley, having the slow-moving ox-bow Bogotá River running throughout its entire length. This stream finally finds its way to the upper sources of the Amazon River. The land is very fertile. The climate is mild, something like spring in the State of New York. These physical conditions are naturally favorable for the development of parasites, especially in the wet season. These sabanas are over 8,000 feet above sea level and demonstrate that altitude alone is not an important factor in the prevention of parasitic infestations, as will be seen from the report that follows.

Although sheep were first brought here about 400 years ago by the Spanish settlers, the sheep industry, properly speaking, is only beginning to be developed at the present time for the purpose of raising wool for the making of woollen goods for domestic use. There are two large establishments in Bogotá which manufacture woollen goods, and it is necessary to have the wool of at least 35,000 sheep annually to keep them going economically. At present wool must be imported, but on account of the expense of transportation (even with the prevailing low prices of wool in England) it would be cheaper to raise sheep for wool on the sabana. There are about 10,000 sheep in this region at present, including about 500 purebred

animals—Dorsets, Rambouillets and Merinos from France; Southdowns, Lincolns, Shropshires and Romney Marsh from England; and a few of various breeds from Uruguay and the United States; however, France and England are the favored countries from which domestic animals are imported.

There is a parasitic condition found in the sheep of this region known as "anemia tropical," "paperas" or "lombrices," according to the most prominent symptom present. Pale mucous membranes, a marked edema, especially in the submaxillary region (paperas), emaciation, dark fetid diarrhea and toward the end pronounced weakness followed by death, are among the principal symptoms. Lombrices refers, popularly speaking, to the diarrhea, but literally means worms. The appetite is good until a few days before death. The disease is attributed to the small liver fluke (*Fasciola lanceolata*), popularly known as mariposa, but in all sheep autopsied comparatively few flukes were found, and not in sufficient number to explain the marked symptoms.

An examination of the feces on September 30, 1920, showed the presence of the eggs of *Strongylus* (*Haemonchus*) *contortus*. On postmortem, October 1, after slaughtering an advanced case, a congestion of the mucous membranes of the abomasum and duodenum, together with a catarrhal inflammation, were found. The stomach contents consisted of a dirty brownish liquid, in which were seen a large number of stomach worms, some swimming about freely in the fluid and some



Sheep Affected with Stomach Worms

attached to the stomach walls. They were also found in a similar way in the duodenum throughout half its length. The female is about an inch in length and the male one-half to two-thirds of an inch. They agree with the description given by Dr. B. H. Ransom for the stomach worm of sheep (*Haemonchus contortus*) in the *Cornell Veterinarian* of April, 1920.

Treatment.—The 1 per cent copper sulphate aqueous solution, as first used successfully by Thielcr in South Africa and recommended by Ransom, was tried. The following doses were used: For lambs 3 months to 9 months old, 20 to 50 mils; sheep over 1 year of age, 60 to 100 mils. All animals treated were fasted from 18 to 24 hours before they were given the treatment. The treatment was repeated twice at an interval of three weeks. Four flocks of sheep were treated, with a total of 2,000 sheep. In three of the flocks the results were excellent, the disease cleared up, the animals gained weight rapidly, and in some of the advanced cases the edema of the jaw passed away.

The fourth flock treated was located on an adjoining sabana about 60 miles away, and in spite of the treatment the sheep kept on dying at the same rate and showed the same symptoms after treatment as before treatment. An effort was made to find out the reason for the failure of the treatment by looking for the encysted stomach worm, *Strongylus* (*Ostertagia*) *ostertagi*. On autopsy the lining of the fourth stomach (abomasum) was found to be studded with raised white swellings about the size of a pinhead to a small pea; the wall of the stomach was twice as thick as normally and a straw-colored exudate was present in the walls and in the abdomen. The encysted stomach worm was found in the raised swellings. *Strongylus* (*Haemonchus*) *contortus* also present in large numbers. It was recommended that the visibly affected sheep be slaughtered and that the pasture be changed to a dryer region. This is being carried out, and it is too early as yet to make any statement as to the result.

Some bladder worms, *Moniezia alba*, were found in a few imported sheep which had died from other causes (in transit). No cases of *Oesophagostoma columbianum* (nodular disease) in the intestines were found.

The only external parasite found was the common sheep tick.

GRANULOMA OF THE FROG IN THE HORSE

By ERNEST F. JARDINE

Government Veterinary Surgeon, St. Kitts, British West Indies

THERE is a condition here, seen most frequently in mules, but occasionally in horses, in which the horn of the frog disappears entirely leaving bare the sensitive structures, which naturally, from constant friction with the earth, irritates the parts causing exuberant granulations accompanied with lameness. On the other hand, and these are the most frequent, from the excessive height of the wall, the hoof becomes contracted; but this contraction is seldom accompanied with lameness, and but for the condition of the frog, which becomes injured from sharp stones on the road, the animals could continue at work. The condition has a certain resemblance to canker, with the exception that it has no tendency to involve or encroach upon the sole; and the rapidity with which the condition responds to treatment. I am frequently puzzled as to how and why it is that even the contour of the frog disappears and leaves a denuded, bleeding surface, sometimes the shape of a marble with a pedicle, and at other times with a sessile base.

I attribute the cause to filth, as it is rarely seen in well kept animals. The continual standing in urine, the ammonia of which macerates and decomposes the horn, will produce it.

Treatment: If the condition is seen in the early stages, it is comparatively simple to treat. Lower the wall, dust parts with calomel and iodoform, alum, copper sulphate in powder, or 50 per cent solution; pine tar on oakum with leather sole to retain in place; all have their sphere of usefulness. In fact, the condition is treated as one would a case of thrush, which is generally the origin of it. When the condition becomes neglected and long standing, when it becomes a sort of tumor, the only cure is extirpation.

If the growth is small, with a well-defined neck and the animal is of a quiet disposition, I usually hook the growth with a tenaculum and with a quick incision excise it; otherwise, the patient is cast, and the growth dissected out.

The wound is covered with boric acid packed with cotton wool and bandaged. The dressing is removed in 24 hours to 48 hours and if there is no formation of pus, it is not washed; otherwise it is, and redressed with boric acid. In about one week's time

the animal is shod, the part protected with tar and oakum and a leather sole, and the animal returned to work.

Of course it is understood that everything connected with the operation is done as aseptically as possible.

INTUSSUSCEPTION IN A COLT

By C. A. CARY

Auburn, Ala.

At the Veterinary College clinic of the Alabama Polytechnic Institute, Dr. I. S. McAdory brought in a colt in a moribund condition. This colt was about one week old. No definite diagnosis was made and the colt soon died. Post-mortem examina-



Intussusception in a Colt

tion was made by Dr. N. G. Covington and eight intussusceptions were present in the small intestines. Two of them were displaced by students examining them. The other six are shown in the accompanying photograph.

A lady student of the University of Liverpool, England, Miss Edith Gertrude Knight, has been successful in passing with honors the second examination for the degree of Bachelor of Veterinary Science and also the second examination for the diploma of M. R. C. V. S.

ABSTRACTS

A SIMPLE METHOD FOR THE DETERMINATION OF THE NUMBER OF BACTERIA IN BACTERIAL SUSPENSIONS. K. A. Fries. Centralbl. f. Bakt., Jena, 1921, vol. 86, pp. 90-96.

After reviewing the various methods used for the standardization of bacterial suspensions, the author is of the opinion that the standardization by the counting chamber method has proved most satisfactory, but based upon his own work and also upon Saltmann's extensive investigations carried on in the Hygienic Institute of the University of Berlin, he is of the opinion that if it is desired to count small bacteria, the counting chamber method is very tedious and tiresome for the eyes; besides it also consumes a great deal of time. In the experience of the author the following method which he developed has proved very rapid and most accurate for the standardization of bacterial suspensions.

PREPARATION OF THE STANDARD FLUID

A suspension of yeast in physiological salt solution preserved with 5 per cent phenol is prepared. The strong preservation is necessary on account of the difficulty of keeping the standard fluid in a sterile condition. Other methods of preservation might give equally as good results.

A piece of ordinary yeast (*Saccharomyces cerivisiae*) is dissolved in the phenolized salt solution. The yeast should be fresh, otherwise there is danger that foreign bacteria may be contained in the same and frequently in such great quantities that their presence may later be detrimental for the determination of the number of bacteria in the suspension.

The number of yeast cells in the standard fluid should vary between 20 and 30 million per cc. In order to obtain a suspension of this strength it is as a rule sufficient to dissolve a piece of yeast the size of a hazel nut in one liter of carbolized salt solution. The flasks should also contain approximately 100 small glass beads.

Following the dissolving of the yeast the bottle should be shaken preferably in a shaking apparatus. The shaking should distribute the yeast cells uniformly throughout the fluid. The counting of the yeast cells in the fluid is then undertaken.

For this purpose a Thoma-Zeiss or the Hayem-Nachetsche chamber is preferable. A control counting in both of the chambers is desirable. The results will be more satisfactory if the greatest number of squares are counted in the chamber. In the Thoma-Zeiss apparatus at least 100 squares should be counted; whereas in the other 8 to 10 squares will be sufficient. If the count shows that the number of cells per cc. is of the desired quantity we have a suitable standard fluid. One liter of such fluid is sufficient for about 500 determinations.

Should counting of the standard fluid show a greater number of yeast cells than 20 to 30 million per cc., the fluid should be diluted to the desired quantity; whereas if the number of cells are not present in the required numbers, then either more yeast is added or the suspension is allowed to stand for several days, after which some of the supernatant fluid is decanted, which naturally would increase the number of cells per cc. in the remaining fluid.

On account of the large size of the cells the counting is readily accomplished, which also facilitates a comparative counting of the bacteria in the suspension to be counted.

THE METHOD OF PROCEDURE OF THE BACTERIAL COUNTING

With the aid of the standard fluid the bacterial contents of any suspension can be readily determined. After thoroughly shaking, 0.2 of a cc. is taken from the fluid to be tested with the aid of a pipette and placed into a flask or a reagent glass. Then 2 cc. of the well-shaken standard fluid is added to the bacterial suspension as soon as possible. The mixture is then thoroughly shaken, and with the aid of a Pasteur pipette a small quantity is taken up and quickly dropped upon a clean slide. This is carefully dried over a flame or in the air and the preparation is then carefully stained. Any ordinary stains are satisfactory for this purpose. However, a diluted fuchsin stain is preferable. As a result of the phenol contents in the standard fluid a very good staining is obtained with the fuchsin. After the stain has acted upon the preparation for a short time it is rinsed off and examined under an oil immersion lens. If it is found that the cells are well distributed, as is usually the case if proper care has been taken, the counting may be undertaken. On the other hand, if it is found that the cells are not well distributed, in order to count them accurately the mixture

is diluted with the corresponding quantity of physiological salt solution before the counting slide is prepared. It may also occur that the relation of the yeast cells to the other cells is not such that an accurate counting may be undertaken as, for instance, when the proportion of the bacteria is very much larger than the number of yeast cells. In such cases, of course, this relation may be changed by another mixing, for instance, using a smaller quantity of the bacterial suspension to be examined. Even the beginner will soon find the correct way as to the best procedure. It may be accepted as a rule that by counting with the so-called net-micrometer, the number of organisms can be counted in even a more concentrated form than if the counting is made in consecutive fields. Therefore a rule may be established that for accuracy's sake not less than 250 yeast cells and the corresponding number of bacteria should be counted. Of this number, 250 yeast cells may be found either in 10 different fields or in a greater or smaller number of squares in the net-micrometer, if such is used. If we assume that in counting 10 fields we find 256 yeast cells and 814 bacteria and if of the bacterial suspension 0.2 cc. and of the standard fluid 2 cc. were used the question arises, How many bacteria are present per cc. in the suspension? The desired number is then found according to the following formula:

$$\frac{\text{Volume of Yeast Cells.} \times \text{Number of Bacteria. } K}{\text{Volume of Bacteria.} \times \text{Number of Yeast Cells.}} = X$$

K is the consonant which indicates how many millions of yeast cells are present per cc. in the standard fluid. Thus, if the above figures are placed in this formula and if the contents of the standard fluid is taken as 25 millions per cc. then we have:

$$\frac{2}{0.2} = \frac{814}{256} \cdot 25 = X \quad X = (795) = 800$$

The number of bacteria in the bacterial suspension therefore was 800 million per cc. In case the first examination of the slides establishes a mixture of too large a concentration in order to make an accurate counting possible, then the mixture can be diluted as stated above. This, however, has no effect whatsoever on the above formula.

The preparation of the standard fluid for counting should proceed rapidly. With this in view immediately after placing

the small drop of the suspension on the center of the counting chamber the cover glass should be slid from the side over the drop. If this operation is not rapidly carried out there is danger that the counts may be erroneous. The best results are obtained if the bacterial-yeast mixture is not of a too high concentration. Also quicker results are obtained if consecutive fields are counted in the place of a number of squares in the Hayem-Nachetsche chamber. The author recommends that in case the bacterial suspension is too concentrated, to take 0.2 cc. of the same and 2 cc. of the yeast suspension and add 5 cc. of water. After this mixture is carefully shaken 6 drops are placed on a slide with the aid of a pipette. After drying and staining of this preparation, the counting is undertaken.

The advantages of this method over Wright's method are that we do not have to depend on the human blood, which in itself must be carefully handled and also is subject to considerable fluctuations. Besides, the standard yeast cell fluid is always ready for use.

A. EICHHORN.

REPORT OF THE DEPARTMENT OF VETERINARY SCIENCE. Indiana Sta. Rpt. 1920, pp. 43-47. Abs. in Exp. Sta. Rec., vol. 45 (1921), No. 2, p. 176.

Hog cholera feeding experiments failed to demonstrate the presence of the virus in the urine and feces of hogs having acute cholera. In infection experiments, healthy controls, separated from pigs inoculated with cholera blood by wire partitions placed 3 feet apart, contracted the disease in from 17 to 23 days. Numerous attempts made to isolate *Bacillus suispestifer* from the feces of hogs affected with cholera and dysentery proved unsuccessful. Pigs that were fed cultures of *B. suispestifer* sickened and developed diarrhea, but in no case was *B. suispestifer* recovered from the feces, although an organism somewhat resembling it was constantly isolated. The administration of thymol-chenopodium in capsules failed to prove of value in removal of intestinal worms.

In an outbreak of a disease in horses that resembled forage poisoning, in which 16 of 32 horses on a farm died between February 15 and March 2, an organism morphologically similar to *B. botulinus* was obtained from the cecum of one horse, but it did not produce toxin. Botulinus antitoxin of the B type

was administered subcutaneously in doses of 40 to 80 cc., repeated in two days, but did not seem to prevent the disease or retard its progress.

The preparation of chicken-pox vaccine was begun early in the year, 1,286 birds in six flocks being tested with satisfactory results. A summary is given of the laboratory diagnoses made during the year, and reference is made to the production of antihog-cholera serum and serum tests and to agglutination and bacterin tests.

ON THE VALUE OF NON-SPECIFIC IMMUNIZATION IN THE ERADICATION OF VIRULENT FOOT-AND-MOUTH DISEASE. E. F. Muller, Schweiz. Archiv. fur Tierheil., vol. 63 (1921), p. 326.

The great epizootic in 1920 brought out the fact that the treatment with serum from recently recovered animals confers no greater immunity than normal serum injection. Favorable results were obtained in thousands of cases treated with intramuscular injection of 100 cc. of "Aolan," a non-specific remedy, causing neither febrile nor anaphylactic reactions. Symptomatic treatment must not be omitted. The enormous loss of water, which unfavorably influences the heart and intestinal tract, must be replenished and general care taken along with the non-specific treatment.

(Aolan is a sterile solution of milk albumin advocated by E. F. Muller for treatment of sykkosis parasitaria, furunculosis and other staphylococcus skin infections.) W. N. BERG.

A CASE OF CANCER OF THE STOMACH IN THE HORSE. D. Kramell, Berl. Tier. Woch., 1919, p. 259.

A 14-year-old gelding gradually became emaciated, extending through a period of 10 months. The animal showed symptoms of chronic gastric catarrh. On post-mortem examination a cleft, semi-spherical tumor of about 35 cm. in length, 22 cm. in width and 15 cm. in thickness, was found in the esophageal portion of the stomach. Microscopical examination revealed the tumor to be a flat-celled epithelial cancer, with the formation of cancer pearls.

J. P. O'LEARY.

THE DIAGNOSIS OF ANTHRAX THROUGH THE EXAMINATION OF THE BONE-MARROW. W. Pfeiler. Deut. Tier. Woch., 1919, p. 110.

The cultural examination of the bone-marrow recommended by Wulff in the year 1912 had proved reliable, when the testing of other organs failed, owing to putrefaction. On the other hand, the microscopical tests of the bone-marrow and the animal tests were not always a diagnostic certainty, particularly so in the case of the microscopic examinations. The bacteriological examinations are rendered more reliable by means of the plate procedure. At the same time, according to Pfeiler, the precipitation method should be used in all cases as a supplemental aid in diagnosis.

J. P. O'LEARY.

CHAULMOOGRA OIL IN THE TREATMENT OF TUBERCULOSIS. W. S. Culpepper and M. Ableson. Jour. Lab. and Clin. Med., Vol. VI (1921), p. 415. Abs. in Amer. Rev. of Tuberc., Vol. V. (1921), p. 124.

The similarity in morphology and staining characteristics of leprosy bacilli and tubercle bacilli, and the specific action of chaulmoogra and its related oils on the acid-fast group of bacteria, furnish a scientific basis for using them in the treatment of tuberculosis. The acid fractions of chaulmoogra oil, obtained by the method of Hollmann and Dean and modified by Aldrich, were used in the following experiments: Forty-eight guinea pigs were divided into 5 groups: (1) 12 pigs were inoculated with human type tubercle bacilli and left without further treatment as tuberculosis controls; (2) 12 pigs were similarly inoculated and divided into groups of 3 each, which were given intraperitoneal doses of the acid sodium salts of the four fractions, A, B, C and D, of acids of chaulmoogra oil; (3) 8 pigs were left as entirely untreated controls; (4) 12 non-tuberculous pigs received the same treatment as the tuberculous pigs of group two; (5) 4 pigs received increasing amounts of the A, B, C, and D fractions in a toxicity test. This report is described as preliminary; but the following findings are given: One per cent solutions of the acid sodium salts of the four fractions are least irritating and are readily absorbed from the peritoneum. No pathological findings could be attributed to the drug. On the other hand, it seemed to cause an increase in weight. A bac-

tericidal action on tubercle bacilli in 1:10,000 dilution was found. Of the 12 pigs inoculated with tuberculosis and not treated all died except one. Of the 12 treated tuberculous pigs only one died of the disease. The others were killed for comparison, one whenever a tuberculous nontreated pig died. A marked difference in pathological findings was observed, the advantage being in favor of the treated pigs. Treated pigs showed an average gain of weight of 49 gms. over the ones not treated.

CHAULMOOGRA OIL IN LEPROSY AND TUBERCULOSIS. L. Rogers. *Lancet*, June 4, 1921, p. 1178. Abs. in *Amer. Rev. of Tuberc.*, vol. 5 (1921), p. 168.

A recent experimental investigation has been made with derivatives of chaulmoogra oil, especially sodium morrhuate, sodium gynocardate and hydnocarpic acid, which had proved effective in the treatment of leprosy, in animals infected with tuberculosis. In the acute general tuberculosis produced in very susceptible animals, the results were entirely negative, except for an early febrile reaction followed by a fall of temperature, in 2 goats which eventually succumbed to the infection at about the same time as a control animal. It is pointed out that these animal infections are equivalent to acute general tuberculosis in man, so that the failure in such cases does not prove the drugs to be useless in the more chronic forms of tuberculosis, which form the great majority of human cases. Rogers concludes that these drugs are worthy of further trial in the more chronic forms of the disease, and especially in lupus and surgical tuberculosis, where any changes will be visible and easily observed.

We have just received a copy of an able address on the subject of tuberculosis, delivered recently by Dr. W. H. Dalrymple before the East Baton Rouge Parish Anti-Tuberculosis League, of which he is an active member. In his address Dr. Dalrymple gives a brief résumé of the accomplishments of research workers and what is being done to suppress and eradicate this dreaded scourge of both animals and human beings. The address was devoted largely to human phases of the subject and has been published in pamphlet form.

REVIEWS

ANATOMIE REGIONALE DES ANIMAUX DOMESTIQUES TOME III.
PORC. (Regional Anatomy of the Domestic Animals. Vol.
III. The Pig.) By E. Bourdelle. Librairie J. B. Bailliere
et Fils, Paris. 1920.

This is the third book of the series on the Regional Anatomy of the Domestic Animals by Montane and Bourdelle, professors of anatomy in the Veterinary Schools of Toulouse and Alfort, respectively. The first, that on the horse, appeared in 1913, and is a most impressive book of 1069 pages and 564 figures. In the preface to that volume the authors refer to the excellent treatise (*Anatomie comparée des animaux domestiques*) conceived and published by Chauveau, the great French master of anatomy, and continued and amplified by worthy successors, Arloing and Lesbre, as constituting the fundamental source of veterinary anatomical knowledge. The authors then raise the question whether the method of presentation employed in this classical text and adapted to the traditional method of instruction is capable of certain modifications which would adapt it better to practical requirements. In answering this question the attempt is made to substitute the "practical idea of relations" for the "functional idea of the organ." This might fairly be paraphrased as a substitution of the topographic method for the systematic. If the reviewer may be permitted to express an opinion on this point it seems to him rather futile to indulge in a polemic on the relative values of these methods. Both methods have essential values which should be realized as far as is possible within the limitations imposed by the capacity of the anatomical worker and the time available in a well-balanced curriculum. A great amount of our anatomical knowledge is useful mainly as physiological material, and, so far as the veterinarian is concerned, much of it is valuable solely on this ground. On the other hand the field of veterinary surgery is circumscribed by limitations which do not exist in human practice and which, so far as we can see at present, are not likely to be removed. It would seem that the authors of the work under consideration have taken these facts into account, since a large amount of their treatment of the subject is distinctly systematic and not topographic; indeed one may justly say that the strictly topographic

matter constitutes a minor part of the contents. This is not intended as an unfavorable criticism, except in the sense of a suggestion that the title does not appear to designate quite accurately the character of the work. The question is perhaps an open one as to the wisdom of incorporating in a text book of regional anatomy of the horse, for example, 319 pages dealing with general consideration of the various systems and anatomical methods, together with a great deal of space devoted to systematic descriptions of bones, joints, muscles, etc. The necessary result is a book of very great bulk (1069 pages) in proportion to its content of actually topographic description. The reviewer does not feel that these systematic descriptions include any important additions to our knowledge, although the numerous figures, most of which are excellent, are very welcome.

The volume on the pig is a handsome book of 386 pages, and, on account of the death of Professor Montane several years ago, is exclusively the work of Professor Bourdelle. It contains 167 figures, which are, with very few exceptions, original and of high quality. It is generally recognized that good illustrations are a *sine qua non* in anatomical publications, and in this respect M. Bourdelle is to be warmly congratulated. When it is noted that a great many of the illustrations—including most of the more difficult ones—are the work of the author, one realizes that M. Bourdelle combines the painstaking skill of the trained anatomist with artistic ability of a high order. Only those who have done work of this kind can realize the difficulties involved and can appreciate fully the value of this contribution to veterinary anatomical literature.

The first 68 pages are devoted to general consideration of the zoological position, morphology, and the various organ-systems. The second part contains the regional anatomy. A good deal of space, however, is given to systematic description of the bones, joints, muscles, etc., so that the strictly topographic matter is not quite so full nor so accurate in certain directions as one might wish. In this respect the account of the thoracic and abdominal viscera is a little disappointing. The technique of *in situ* hardening and frozen sections and combination of these methods seem still to be little used by European veterinary anatomists and this defect in procedure is incomprehensible to American workers. One is almost shocked to learn that in Europe the surfaces of the pig's liver are both moderately convex.

Fortunately Professor Bourdelle gives two excellent full-page, colored figures illustrating lateral views of the viscera in situ. The topography of the head, neck and limbs is well depicted by a sufficient number of colored figures of generous size. For the large number of veterinarians who do not read French these excellent illustrations constitute the chief value of the book, and one may be permitted to express the hope either that translations may be available or that the revised Latin names might be given in future editions. In this way these masterpieces of Bourdelle and the lamented Montane might receive the international recognition which they so well deserve. S. S.

A COMPLIMENT TO PROFESSOR WILLIAMS

In the August, 1921, number of THE JOURNAL, the attention of the members of the veterinary profession was called to a book recently published by Dr. W. L. Williams on "The Diseases of the Genital Organs of Domestic Animals." A review of this book by Dr. J. Whitridge Williams appears in the September, 1921, number of the *Bulletin of The Johns Hopkins Hospital*, in which the author states, in referring to Dr. W. L. Williams' book:

"This large volume by the professor of obstetrics and of research in the diseases of breeding cattle in the Veterinary College of Cornell University is highly creditable to its author and represents a valuable contribution to American medical literature. I earnestly recommend it to scientifically minded obstetricians and gynecologists, as I feel sure that when they have read it they must agree with me that they have learned much, have had their imagination stimulated, and have to confess, so far at least as certain problems are concerned, that human gynecologists may learn something from their veterinary colleagues."

The review, as a whole, speaks very highly of the recent publication on "The Diseases of the Genital Organs of Domestic Animals," and as it is written by one of the foremost authorities on obstetrics and gynecology in the medical profession, it is regarded as an unusual compliment to the veterinary profession, as well as to Professor Williams.

ARMY VETERINARY SERVICE

A LETTER FROM GENERAL IRELAND

The Officers' Reserve authorized by law since 1920 and now in a position, under the new regulations, to complete its organization, is bound to become a tremendous asset to the country in future emergency. It provides a reservoir of civilians from which will be drawn officers of reasonable training and experience, commissioned in appropriate grades and assigned beforehand to specific duties for which they are fitted. All branches of the service are represented by sections in the Reserve. One who recalls the almost insurmountable difficulties associated with the mobilization of the veterinary profession in 1917, will appreciate the importance of our having for the future a large, representative, and well organized Veterinary Reserve Section. If, to the enthusiastic support which the civilian profession gave the veterinary service during the World War, there could have been added such qualifications as military training and instruction, predetermined rank and position in the military forces, and active, intelligent interest in Army veterinary matters, the problem of organizing the veterinary service would have been relatively simple. A large membership in the Reserve is absolutely necessary for the best results in the future.

The veterinary section of the Reserve now has some 400 officers and is slowly growing. Membership therein is evidence of a patriotic desire on the part of the individual to fit himself to render the best possible service to his country when it needs him. I like also to feel that such membership is a manifestation of interest and support for the Veterinary Corps, which represents the veterinary profession in the Regular Army. I can assure you that a Reserve composed of representative civilian veterinarians will prove a valuable asset to the Veterinary Corps in its development and progress. Thus far, the Reserve does not seem to have attracted the veterinarians of the country as a body, particularly the older men, many of whom have been in the Army. This is an unfortunate situation which it will give me profound satisfaction to see corrected.

I trust you may be able to give these matters proper pub-

licity to aid in arousing a healthy interest in the Veterinary Officers' Reserve amongst the members of the veterinary profession.

M. W. IRELAND,

Surgeon General, U. S. Army.

NEW REGULATIONS FOR OFFICERS' RESERVE CORPS

The new regulations for the organization and administration of the Officers' Reserve Corps have been completed and the issues are now being made by the Adjutant General of the Army. The distribution contemplates the issue of one to each Reserve Officer.

These regulations were drawn up by a committee composed of an equal number of Regular Army officers and officers of the Reserve Corps and National Guard and have been issued by the Secretary of War as Special Regulations 43.

The purpose of the Officers' Reserve Corps is to provide a reserve of officers available for military service when needed and is intended to furnish the necessary officers for assignment to all components of the Army of the United States.

STATUS OF THE OLD VETERINARY RESERVE CORPS

A large number of veterinary officers were commissioned during the World War in the Veterinary Reserve Corps. By the Presidential Proclamation of August, 1918, these officers, while on active duty, lost their identity as Reserve Officers and became Veterinary Officers of the Army of the United States which absorbed all existing units whether of the Regular Army, National Army or National Guard. The only distinction existing between officers therefore was the term of commission, some being permanent and others temporary.

The discharge of these officers after the war effected a complete separation from the military establishment, that is to say, temporary officers did not revert to their former status as Reserve Officers. Unless such former officers have been offered and have formally accepted commissions they are not now officers of the Reserve Corps. Members of the old Veterinary Reserve Corps who were not called to active duty during the war were automatically transferred to the new Reserve Corps.

Former officers should know, therefore, that they are not members of the Reserve Corps unless they have accepted a com-

mission formally tendered by the Adjutant General since their discharge from the Army. Their desire to become members of the Reserve Corps, signified at the time of their discharge (Form 105), does not itself commission them as Reserve Corps officers.

THE NEW OFFICERS' RESERVE CORPS

Composition.—A Reserve Section has been created corresponding to each branch of the Regular Army. The President, furthermore, is empowered by the Act of June 4, 1920, to create such additional sections as may be required. Accordingly the Medical Department Reserve comprises Medical, Dental, Veterinary, Medical Administrative and Sanitary Sections. The Medical, Dental and Veterinary sections are composed of graduates of reputable medical, dental and veterinary schools, the Medical Administrative Section of persons having practical experience in administrative duties pertaining to the medical department, the Sanitary Section of persons of broad experience and ability who have had practical experience in professions and occupations allied to special duties of the Medical Department exclusive of administrative duties. This latter comprises psychologists, sanitary engineers, food and nutrition experts, chemists, hospital architects, laboratory and X-ray technicians, statisticians and technical men engaged in the production of supplies and appliances used by the Medical Department. Many of these were commissioned during the war in the Sanitary Corps which ceased to exist on December 31, 1920.

APPOINTMENT

Eligibility.—In time of peace citizens of the United States and the Philippine Islands between 21 and 60 years of age.

Officers of the Army of the United States between April 6, 1917, and June 30, 1919, National Guard Officers holding federally recognized commissions as such on June 4, 1920, and persons who served in the Army between these dates and were recommended for commission, may be appointed upon examination of military records supplemented by personal examination if necessary.

Civilians—that is, those without previous military service—are eligible for appointment in the Reserve Corps upon examination, to any grade for which found qualified.

After November 11, 1923, no appointment will be made

solely upon the examination of records and former officers will be examined and appointed under the provisions applying to civilians without such service which regulations provide for an examination under the direction of Corps Area Commanders with final action by the War Department. (Further provisions are made in the regulations for appointment of graduates of Reserve Officers' Training Corps, Flying Cadets, Warrant Officers, enlisted men, etc.)

Applications for appointment should be addressed to the Commanding General of the Corps Area in which the applicant lives. These Corps Areas are as follows:

First Corps Area. Headquarters, Army Base, South Boston, Massachusetts. Comprises the States of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island and Connecticut.

Second Corps Area. Headquarters, Governors Island, New York. Comprises the States of New York, New Jersey and Delaware.

Third Corps Area. Headquarters, Fort Howard, Maryland. Comprises the States of Pennsylvania, Maryland, Virginia and the District of Columbia.

Fourth Corps Area. Headquarters, Fort McPherson, Georgia. Comprises the States of North and South Carolina, Georgia, Florida, Alabama, Tennessee, Mississippi and Louisiana.

Fifth Corps Area. Headquarters, Fort Benjamin Harrison, Indiana. Comprises the States of Ohio, West Virginia, Indiana and Kentucky.

Sixth Corps Area. Headquarters, 1819 West Pershing Road, Chicago, Illinois. Comprises the States of Illinois, Michigan and Wisconsin.

Seventh Corps Area. Headquarters, Fort Crook, Nebraska. Comprises the States of Missouri, Kansas, Iowa, Nebraska, North and South Dakota, Minnesota and Arkansas.

Eighth Corps Area. Headquarters, Fort Sam Houston, Texas. Comprises the States of Texas, Oklahoma, Colorado, New Mexico and Arizona.

Ninth Corps Area. Headquarters, Presidio of San Francisco, California. Comprises the States of Washington, Oregon, Idaho, Montana, Wyoming, Utah, Nevada and California.

Grads. Appointments of officers of the World War will not

be made in a grade higher than that previously held in the Army.

Period of appointment. Five years. A reappointment will generally be tendered without examination.

Acceptance of appointment. There must be a formal acceptance or declination. If not accepted or declined within 60 days the appointment will be cancelled.

Dual commission in the Reserve Corps and National Guard. A Reserve Corps Officer may hold a commission in the National Guard and vice versa.

ASSIGNMENT

Every Reserve Officer is to be assigned to a unit or specific duty. The term "assignment" refers to a designation or selection for a class of duty or specific duty for which it is contemplated to use the officer in time of emergency and for which it is contemplated he be trained in time of peace. The fact of assignment does not imply active duty. In time of peace the duties in connection with Reserve Units of a permanent or continuing nature will be performed by Regular Officers detailed for the purpose. (See active duty.) Officers are generally assigned to units in proximity to their homes.

Classification. As a basis for assignment the officers of the Medical Department Reserve Sections are classified by the Surgeon General according to their special qualifications as determined by a review of their entire military record and of the "Personal Report and Statement of Preferences for Reserve Officers" which is rendered by each officer. Groups are accordingly made up representing every specialty of medical practice to the end that intelligent and appropriate assignments can be made. The two main groups are then separated—the Territorial Assignment Group and the Branch Assignment Group. The former, TAG, comprises those officers especially suited to fill the positions in the Medical Department of the military units to be organized by the Corps Area Commanders. These comprise the divisions, of which three are to be organized in each corps area, together with certain attached and auxiliary troops.

The Branch Assignment Group, BAG, comprises those held for assignment by the Surgeon General to special duties and activities not included in those organized by the Corps Area Commander. These will include the hospitals functioning be-

hind the division, such as the surgical, evacuation, convalescent and general hospitals and other medical department units of the communication zone and zone of the interior, as well as special units concerned with the mobilization and administration of the medical department service.

All Reserve Officers, however, residing in a Corps Area are under the administrative control of the Corps Area Commanders.

ACTIVE DUTY

According to law no Reserve Officer shall be employed on active duty for more than 15 days in any calendar year without his own consent, except in time of a national emergency expressly declared by Congress. So far as practicable the personal desires of officers to be called to active duty will be considered when funds for training for only a portion of the Reserve Force in any year are available. The funds appropriated by Congress are at the present time insufficient to train any considerable number of Reserve Officers, even volunteers. Only volunteers will be detailed to active duty, funds permitting, for instruction at Service Schools or with the Regular Army for a period of more than 15 days.

Exemption from active duty. A Reserve Officer called to active duty for training purposes during any calendar year and upon whom such duty, for business or other good reasons, would work a hardship, will, upon request, be exempt from such tour of duty.

PAY AND ALLOWANCES (ON ACTIVE DUTY)

Same as for officers of the Regular Army in the same grade and with the same length of service, and mileage from his home to his first station and from his last station to his home. Reserve Officers are not entitled to retirement or retired pay.

TRAINING

The training program will be announced annually when appropriations have been made by Congress. It is the aim of the War Department to establish training facilities for 15 days every calendar year for Reserve Officers who can, without hardship, devote this time to training. Additional training, consisting of long periods of instruction at Service Schools and duty with the Regular Army and participation in Regu-

lar Army activities, may be added to this program from time to time.

PROMOTION

A uniform system of promotion alike for all branches of the Reserve has been established. For all sections of the Officers' Reserve Corps promotions may be made under the following conditions:

(a) An officer must signify his willingness and must be recommended to be examined for promotion.

(b) An officer must have served the prescribed minimum time in the grade from which promotion is contemplated.

(c) An officer must have satisfactorily passed the promotion examination.

Minimum time to be served in each grade. To be eligible for promotion to any grade an officer must be credited with three years' service in the next lower grade, *one year of which must in every case have been in the Officers' Reserve Corps since November 11, 1918.* In computing the required three years' service in any grade, there will be credited service in that grade in the Officers' Reserve Corps since November 11, 1918, and active service in the same or higher grade in any component of the United States Army between April 6, 1917, and December 31, 1920, *double time* being given for such of the *above active service* as was rendered during the period of hostilities; *i. e.*, between April 6, 1917, and November 11, 1918. Except for the one year which must have been in the Officers' Reserve Corps, there will also be credited service as a federally recognized officer of the National Guard since November 11, 1918. No service of any kind prior to April 6, 1917, is to be credited, nor is any but active service between April 6, 1917, and November 11, 1918, to be credited.

Examination. Conducted by Corps Area Commanders by board of three officers not lower in grade than that of the applicant.

Scope of the examination. (a) Physical fitness; (b) moral character; (c) general fitness; (d) professional fitness.

The professional examination consists in:

1. Basic military subjects, essential to all branches of the service for all officers of the Medical Department:

<i>Subject</i>	<i>Scope</i>
Administration.	General knowledge of regulations and care and use of Government property as applicable to the officer as an individual; channels of correspondence.
Customs of the service, courtesy and military discipline.	The essential customs of the service and the courtesy expected of all officers; the purpose of discipline and the best means by which maintained.
Military hygiene.	Personal hygiene in the field and the conservation of health.
Practical efficiency.	Ability to put to practical use, in the capacity for which being examined for promotion, the knowledge possessed.

2. Special subjects essential to grade and office to which promotion is contemplated. For veterinary officers this will consist in:

Recent progress in veterinary medicine, surgery and hygiene—animal and meat and dairy.

SUMMARY

The Veterinary Reserve Corps is thus to be organized and administered in the interests of veterinary military preparedness and by regulations drawn up by a committee prescribed by law upon which the Reserve Corps was well represented. Being a national asset to be used in an emergency which in modern times seems to call for the mobilization of practically every activity in the country, it should have the support of the entire veterinary profession. *If the veterinary profession can not support it as thus organized, it should demand that it be so organized as to warrant its support.*

In compliance with law the Secretary of War has provided

1. For the organization of units of the organized reserve of a strength considered sufficient for first-line defense.
2. For the enrollment of Reserve Officers.
3. For the classification of officers with appropriate assignments according to special qualifications.

4. For a uniform system of promotion.

5. For a training program, largely voluntary, which will go so far as Congressional appropriations permit, and at the same time safeguard the civilian practitioner of veterinary medicine from compulsory active service in time of peace when such service would work a hardship.

The variety of veterinary units to be organized would seem to offer an opportunity to every veterinarian to list his services in the general scheme of veterinary preparedness.

Brigadier-General Frey, formerly Director General of the French Army Veterinary Corps, who was recently placed on the retired list by the Minister of War, will make his future home in Paris.

The graduating classes of 1921 at the three French national veterinary schools numbered 136, of whom 63 were at Alfort, 37 at Lyons, and 36 at Toulouse. The total number of students at Alfort at the close of the last school year was 235, and at Toulouse 151. Thirty-seven at Alfort and 13 at Toulouse were from other countries. We have seen no statement of the attendance at Lyons.

A large number of French veterinarians have recently received honors from the French Government in recognition of meritorious service of various kinds—educational, research and military. Prof. Dechambre of Alfort, and Prof. Girard of Toulouse, have been awarded the cross of the Legion of Honor, and the educational distinction of “*Palmes Académiques*” has been conferred on Prof. Arloing of Lyons, and Prof. Panisset of Alfort.

JUST FOR FUN

A schoolboy wrote an essay on cats. The chapter on different breeds supplies the following information:

“Cats that’s made for little boys and girls to maul and tease is called Maltese cats. Some cats is known by their queer purrs—these are called Pursian cats. Cats with bad tempers is called Angorrie cats. Cats with deep feelin’s is called Feline cats.”
—*Selected.*

ASSOCIATION NEWS

AMERICAN VETERINARY MEDICAL ASSOCIATION

Proceedings of Fifty-Eighth Annual Meeting, Denver, Colo., September 5 to 9, 1921

(Continued from the November JOURNAL)

TUESDAY AFTERNOON, SEPTEMBER 6, 1921

GENERAL SESSION

The meeting convened at 1:30 p. m., President White presiding.

PRESIDENT WHITE: The first item of business for the afternoon is an additional report of the Executive Board, which will be presented by Secretary Mayo.

REPORT OF EXECUTIVE BOARD

SECRETARY MAYO: The following applications have been received since the previous meeting of the board. They have been acted upon by the board and are favorably recommended:

Dr. A. E. Anderson, Grand Island, Nebr.
Dr. Hudson Chadwick, Jackson, Miss.
Dr. T. B. Carter, Portland, Oreg.
Dr. B. C. Taylor, Hillsboro, N. Dak.
Dr. D. L. Zee, Minotte, N. Dak.
Dr. A. J. Matelle, Crystal, N. Dak.
Dr. W. H. Hiltz, Elko, Nev.
Dr. F. M. Coombs, Hamiota, Manitoba.
Dr. W. R. Winner, Alma Center, Wis.
Dr. Kenneth J. Moye, Hayes, Kans.
Dr. LaFayette J. Read, Indianapolis, Ind.
Dr. J. G. Townsend, Racine, Wis.
Dr. J. A. Sluss, Rhodell, W. Va.
Dr. George W. Neff, Charleston, W. Va.
Dr. S. C. Ross, Plainville, Tex.
Dr. W. E. Norden, Avoka, Iowa.
Dr. John D. Thrower, Denver, Colo.
Dr. W. A. Stephenson, Salt Lake City, Utah.
Dr. E. J. McBride, St. Paul, Minn.
Dr. George J. Cline, Omaha, Nebr.
Dr. W. L. West, Belfast, Me.
Dr. J. B. Taylor, Brookings, S. Dak.
Dr. H. H. Brown, St. Louis, Mo.
Dr. G. A. Bostrum, Wahoo, Nebr.
Dr. I. B. Boughton, Urbana, Ill.
Dr. V. V. Shattuck, Omaha, Nebr.
Dr. L. C. Cummings, Omaha, Nebr.
Dr. C. C. Officer, Grapeland, Tex.
Dr. J. Pugh, Plainville, Kans.
Dr. Floyd Cross, Fort Collins, Colo.
Dr. W. H. Johnson, Denver, Colo.
Dr. F. A. Laird, Springfield, Ill.
Dr. William Harvard, St. Augustine, Fla.

DR. HOSKINS: I move that the recommendation of the Executive Board be favorably acted upon, and the men whose names have been read be admitted to membership under suspension of the rules, the Secretary to cast the ballot.

(The motion was seconded by Dr. Glover and carried, the ballot was cast, and the applicants were declared elected to membership.)

SECRETARY MAYO: There is the resignation of Dr. R. M. Bell of Buffalo, N. Y. The Executive Board recommends that it be accepted.

(It was voted, on motion of Dr. Glover, seconded by Dr. Adams, that the report of the Executive Board be accepted.)

ELECTION OF OFFICERS

PRESIDENT WHITE: The next item of business is the election of officers. The Chair is ready to receive nominations for the following officers: President, five vice-presidents and a treasurer. Nominations will be made from the floor. Nominations for president are now in order.

DR. BELL: I nominate Dr. Ferguson of Wisconsin.

DR. JENSEN: In rising to second the motion of Dr. Bell, I desire to call the attention of this Association to the urgency of at this time electing a practitioner to this office. This office has been filled by men outside of the rank and file of practitioners. It is not my purpose at all to give you to understand that we don't allow the State school men and men engaged in other lines of endeavor, but in order to support and increase this institution and increase its membership I believe at this time a practitioner should be elected. There has been during the last year, I understand, a decline in the membership, a dropping out of over 300. We have a total membership of something like 3,900 where we should have 7,000. The only way I know of to stimulate interest and increase membership is by electing a practitioner. Therefore, I again take pleasure in seconding the nomination of Dr. Ferguson.

DR. GLOVER: I wish to nominate Dr. A. T. Kinsley. In a small western town there was a merchant who ordered a bill of goods from a wholesale firm in a distant city. The goods were received, but were not satisfactory. They were returned. The first of the month a bill came. It was returned with the merchant's reason. The wholesale firm then sent the bill to the city attorney. Then they sent a sight draft on the bank. Finally the wholesale firm received a letter to this effect: "I am the merchant that got your bill of goods that were not satisfactory. I am also the city attorney in this town. I am also the banker in this town, and if it weren't for the fact that I am also the preacher in this town, I would tell you to go to hell." (Laughter.)

Dr. Kinsley represents every side of the veterinary profession. As an educator he helped to build up the largest and one of the best veterinary colleges in the world. As an author, his texts are used in the veterinary colleges, and his books of reference are found in the library of almost every veterinary surgeon in this country; as a manufacturer of biologics, he has taken a prominent place. As a counsellor in veterinary lines, he is called to every part of the United States. He represents the profession in a large way. We all know Dr. Kinsley. The only objection I have heard anywhere to Dr. Kinsley is the fact that he is interested in commercial enterprises. Can you think of any reason on earth why that should be an objection to a man for the presidency of this Association? Dr. Kinsley has stood four-square before the world, honorable, straightforward, a leader in our profession. We are proud of him, and I want you to understand, as far as I know, in this district we are for Dr. Kinsley for the next President of the Association. (The nomination was seconded.)

DR. ELIASON: In seconding the nomination of Dr. Ferguson, and speaking from the standpoint of a man from his home State, I wish to announce that Dr. Ferguson didn't cause himself to receive this nomination, but has received several letters urging him to run for this position. After getting several such communications, we came here with a view of finding out the sentiment. Dr. Ferguson is an out-and-out practitioner. He has been successful. He has done much to elevate the profession in his own State, and we believe him fully capable for the office for which he is nominated. It is not our purpose to come here to be an obstacle to anyone else, or deprecate the honors which may be given someone else. The good of the Association is the thing that we should have at heart.

(It was voted, on motion of Dr. Stange, duly seconded, that the nominations for president be closed.)

PRESIDENT WHITE: I will appoint the following members to act as tellers: Dr. S. E. Bennett, Dr. C. P. Fitch, Dr. R. D. Marsteller. These gentlemen will kindly distribute the ballots upon which you will write your preference.

SECRETARY MAYO: I have received the following message from Dr. Tom Smith of Jersey City: "Regret that my health will not permit attendance at the convention. The convention should not adjourn without paying some tribute to Dr. W. Horace Hoskins."

PRESIDENT WHITE: Gentlemen, so that you will not be kept waiting so long, and to facilitate matters, I will appoint another set of tellers to distribute ballots for the five Vice-Presidents. Unless you have some objection to this suggestion, I will ask Dr. C. H. Stange, Dr. H. P. Hoskins, and Dr. C. H. Hayes to distribute ballots and act as tellers.

SECRETARY MAYO: I want to call your attention to one section of the Constitution and By-Laws that says that no person shall be eligible to the offices of President, Vice-President, Secretary or Treasurer unless he has been a member in good standing for five years preceding the election.

(The ballot for President was taken and the tellers retired to make the count.)

PRESIDENT WHITE: Nominations for Vice-Presidents are in order.

DR. EICHHORN: Mr. President, I would like to place in nomination the name of a man who has worked the Pacific Coast constantly and strenuously for the veterinary profession, Dr. McKenna of Sacramento, California. (Seconded.)

DR. NEWSOM: Since we started in in the far West, the next in order will be a man from Colorado. I would like to nominate Charles G. Lamb, who has been the leading spirit in the preparations for the convention that is now assembled. He is State Veterinarian of Colorado. (Seconded.)

DR. CARY: I nominate Dr. Hamlet Moore of New Orleans. (Seconded.)

DR. HILTON: I beg to nominate W. A. Hilliard of Winnipeg. (Seconded.)

DR. COTTON: I notice that the extreme East is not represented. I therefore place in nomination Dr. Robinson, Portland, Maine. (Seconded.)

DR. GOW: I notice you have candidates from various parts of the country. I would like to nominate Dr. John Eagle of Kansas City, Mo.

(It was voted, on motion, duly seconded, that the nominations be closed.)

SECRETARY MAYO: It has been customary for several years to make a motion that the one receiving the highest number of votes should be First Vice-President, the second highest, Second, and so on. There are five to be elected.

DR. BELL: I make a motion that that custom prevail.

(The motion was seconded and carried.)

PRESIDENT WHITE: It is customary to vote for five. In case there are more on the ballot, the lower ones will be dropped automatically.

(The ballot for Vice-Presidents was taken.)

PRESIDENT WHITE: The result of the ballot cast for President gives Dr. Ferguson 62 votes and Dr. Kinsley 100 votes. (Applause.) The Chair therefore declares Dr. Kinsley elected President for the ensuing year.

Will the same tellers kindly pass around ballots for the election of Treasurer and collect them? Nominations are now in order for the office of Treasurer.

DR. CARY: I place in nomination for Treasurer a man from

the South. I don't believe we could get a better man for the office, for they don't get them. Therefore, I nominate Dr. Jacob of Knoxville, Tennessee. (Seconded.)

DR. KOEN: I move that nominations be closed and that the Secretary be instructed to cast the ballot of the Association for Treasurer.

(The motion was seconded and unanimously carried, and the Secretary cast the ballot of the Association for Dr. Jacob.)

PRESIDENT WHITE: I declare Dr. Jacob elected Treasurer of this Association. (Applause.)

The result of the ballot cast for the five Vice-Presidents is as follows: Dr. C. G. Lamb, 157; Dr. McKenna, 135; Dr. Robinson, 133; Dr. Hilliard, 122; Dr. Moore, 111. I therefore declare Dr. Lamb First Vice-President, Dr. McKenna Second, Dr. Robinson Third, Dr. Hilliard Fourth, and Dr. Moore Fifth.

I have added to the Committee on Emblem the name of Dr. McKenna of California.

REPORT OF COMMITTEE ON LEGISLATION

PRESIDENT WHITE: We will have the report of the Legislation Committee.

(Secretary Mayo read the report of the Committee on Legislation, as follows:)

Your committee has kept in touch with any legislation which has had any bearing on the advancement of the profession.

The most important contemplated legislation has been that relative to the reclassification of the civil service of the United States. Bills have been introduced in both Senate and House by different members of each body. These bills have been thoroughly gone over by the various committees, but to date no particular bill has been agreed upon. In one of these bills the veterinary profession was discriminated against, and only by the most active work of the profession, both in and out of the Federal service, was this discrimination removed and the profession classified similarly to the other learned professions. The Sterling Joint Committee of Congress on Civil Service Reclassification gave a hearing to Dr. John R. Mohler, Chief of the Bureau of Animal Industry, United States Department of Agriculture, who stated that the veterinarians in the civil service were entirely satisfied with the new classification now given them in the bills as recently amended by the committee.

Your committee has not been regularly called together to make any organized effort toward this reclassification legislation, as it considered it untimely to waste any activity or expend any funds for propaganda work until the Congressional committee had definitely decided upon the character of the bill it would report out of committee. It is believed that the veterinarians are well organized to make this effort when the proper time arrives.

When the call is made to the profession to back up this legislation, which affects thousands of our brethren in the various civil branches of the Federal service, it is hoped that every member will personally interest himself in this work and will so utilize his efforts that Senators and Representatives in Congress will give these illy-paid public servants an adequate, living salary and not keep them in suspense from year to year by merely allowing them the war-time "bonus," a

sort of act of charity by Congress. The efforts of the profession should be directed toward personal interviews with Senators and Representatives, inviting their attention to the very inadequate salaries now paid veterinarians in the civil service and the great loss sustained by the Government every year by the resignation of many highly trained veterinary specialists, owing to the low salaries paid them, and their replacement by untrained men who can not be of much value to the service for several years.

Much good can be directed toward these efforts by veterinarians seeking the aid of livestock associations, breeders' associations, women's clubs and various civic centers.

Your committee is thoroughly aware of the fact that without the aid of each veterinarian it can not be successful in its efforts. Personal activities of veterinarians in their home districts have far more effect on molding the opinions of Senators and Representatives than have high-priced committees convening in Washington. Every veterinarian has the acquaintance of several prominent men in their respective sections; it is truly wonderful the effect that interviews and letters from such citizens have on our national legislators. Short articles in the local press do very much good when properly forwarded to Washington.

The Legislative Committee is ready and anxious to further this legislation in all possible ways when the opportune moment arrives.

JOHN P. TURNER, *Chairman*.

S. J. WALKLEY.

PRESIDENT WHITE: You have heard the reading of this very excellent report. What is your pleasure in regard to it?

DR. KIERNAN: I move that it be adopted and that the committee be urged to keep in touch with the legislation now pending in Congress and serve the Association and profession whenever called upon to do so.

(The motion was seconded and carried.)

REPORT OF REPRESENTATIVE ON ADVISORY BOARD OF THE HORSE ASSOCIATION OF AMERICA

PRESIDENT WHITE: Are any other committees ready to report?

SECRETARY MAYO: I have a report from Dr. Dick, who is a member of this Association representing this Association in the work done by the Horse Association of America.

(Secretary Mayo read Dr. Dick's report, as follows:)

As representative of the American Veterinary Medical Association on the Advisory Board of the Horse Association of America, I want to present the following report of the work done by the Association during the past year.

The first piece of work was the gathering of proof of the superiority of horses and mules in various classes of work. This was the foundation. It was necessary to have proof that horses and mules were more efficient and economical than mechanical motive power or their whole campaign would be useless. Trained investigators were sent to New York, Philadelphia, Boston, Buffalo, Chicago, St. Louis and numerous other cities to collect data from business men, cartage and transfer men, ice companies, coal companies and all users of transportation. It was found that some men had sold their horses and purchased trucks, but after giving them a thorough trial had discarded

them and gone back to horses. The following is what A. Moll Company, wholesale and retail grocers, in St. Louis, had to say on that subject, which is just a sample of many such letters:

"We found after keeping accurate records that the cost of maintaining trucks was astonishing in comparison to horse-drawn equipment, and the service not so reliable. At present we are using 65 head of horses and mules, and I believe as soon as other concerns now using motor transportation figure their costs they will return to horses."

The Horse Association also found that the cost per day of operating a team truck with a pair of heavy draft horses that would pull five tons or more on city streets was from \$4.06 as a minimum to \$7.75 as a maximum, exclusive of driver. With the driver at \$5.00 a day the total would be from \$9.06 to \$12.75 a day.

Against this it was found that it costs from \$25 to \$30 a day to operate a five-ton motor truck, or more than twice as much as a five-ton team truck that would haul the same load.

A company of Evanston, Ill., found that for the entire year of 1919 their cost of delivery with horse-drawn equipment was 6¼ cents and with motorized delivery 8 1-5 cents per package.

In the use of tractors on farms it was found that horse-drawn equipment was more efficient, reliable, economical and flexible than mechanical motive power. One of the most notable examples of this is the farm comprising 30,000 acres owned by the Noble Foundation Company, Ltd., of Alberta, Canada. On this farm it was found that for double disking and harrowing it cost 42 cents an acre with horse-drawn equipment, 60 cents an acre with steam tractors, and 70 cents an acre for gas tractors. This company hitches 12 horses to three grain drills and seeds on an average 75 acres per day per man. They are discarding their tractors and using horses exclusively.

One of the most important facts disclosed by the investigations made by the Horse Association of America is that fixed charges on trucks standing idle exceed the cost of feeding horses with equivalent working capacity. The motor salesman has usually made the claim that it cost comparatively little to keep a truck when it was idle. This should be a serious blow to motor interests.

The next step was to determine the users of horses and mules in non-agricultural work. A list comprising the names of 204,000 firms has been compiled, as follows:

Coal dealers with over \$10,000 capitalization.....	8,746
Teaming and transfer companies.....	7,150
Retail grocers rated over \$1,000.....	59,142
Wholesale grocers	3,827
Department stores	4,688
Packers	388
Ice dealers	6,011
Dray and express companies.....	11,140
Milk dealers	10,167
Grading contractors	762
Gravel and sand companies.....	1,350
Bakeries with over \$1,000 capitalization.....	27,476
Heavy hardware (wholesale).....	1,217
Lumber dealers	27,022
Lumber manufacturers (sawmills).....	16,579
Mines of all kinds.....	18,400
Total	204,065

The first seven groups had been reached on December 1, 1920, with personal letters and circulars dealing with their particular problems.

A supplementary distribution of literature has been made as follows:

- Saddlery firms and their salesmen.
- Hay, grain and feed dealers.
- Horseshoers.
- Horse and mule dealers.
- Wagon and buggy makers and dealers.
- Veterinarians (list of 4,000).
- Country bankers, 23,364.

Another important piece of work undertaken by the Horse Association of America is that of encouraging the production of horses. It has been found that there has been a tremendous decrease in the production of horses in the great horse-producing States. When we realize that the eastern and southern parts of the United States depend on this section for their horses we can appreciate the seriousness of the situation. These horse-producing States are not only falling down on the production of new horses, but those now found on a large percentage of the farms are four years old or over. This means that unless farmers begin to produce horses at once a serious shortage is bound to come suddenly and the prices will be exorbitantly high. This will be to the advantage of the motor interests.

The Horse Association is reaching the farmers by circularizing with letters and leaflets the leaders of farm sentiment. This list is as follows:

- County agents and farm bureau officers.
- Stallion and jack owners and leading horse breeders.
- Bankers in all towns under 30,000.
- Auctioneers and horse buyers.
- Country harness dealers, horseshoers, wagon and carriage dealers.
- Hay and grain dealers.
- State fairs and State boards of agriculture.
- State stallion enrollment boards.

In addition to this, contributions have been made to the agricultural press and to the weekly news service of 1,250 newspapers. This represented up to December 1, 1920, 9,490.5 linear inches reaching over 12,000,000 people.

Another line of work undertaken is the stimulation of the use of horses and ponies in the field of healthful recreation and sport. This included investigations of existing facilities for horseback riding in many of our cities and securing information from noted physicians on the influence of horseback riding on the maintenance of health and vitality in man. The co-operation of the American Remount Association, the Chicago Equestrian Association, the American Saddle Horse Breeders' Association and other saddle horse interests were secured in a nationwide campaign to provide more extensive facilities for horseback riding throughout the country. An effort is also being made to stimulate interest in driving horses for business and pleasure.

Another phase of the work done by the Horse Association of America is the stimulation of production of the right kind of horses. This is being done by literature prepared to show that profitable operation and marketability are dependent upon qualities of efficiency; by cash prizes offered at county fairs, the fairs duplicating the Association's money, and, finally, by direct work of field men who visit leading breeders and farmers, with whom they discuss this problem.

Up to December 1, 1920, a total of 1,100,000 pieces of literature containing the above-mentioned facts had been distributed to men who were interested in efficient, economical motive power units. These letters indicate to some extent the tremendous amount of work done by the Horse Association during the past year. Mr. Dinsmore, in a letter addressed to me on July 25, 1921, said: "Since the last annual meeting we have distributed a little more than one million and a half pieces of literature, and all of this material has gone straight to the men who are directly interested."

This work is apparently producing good results. It is reported from Boston that the sales of horses made by one man during the first four months of this year were over 5,000 head, as against approximately 4,000 head in 1920 for the same months, a gain of 25 per cent. A firm in New York City sold during the first five months of this year 14,239 horses as against 11,605 in the same period of last year. In Chicago the United States census, taken January 1, 1920, reported 30,388 horses. The licenses issued this year to June 1 show that there were approximately 33,660 horses in use in Chicago last spring, a gain of 3,000, or a little more than 10 per cent. Such excellent work should receive the hearty support of every veterinarian. In Pennsylvania the State Veterinary Medical Association and some of the veterinary clubs are actively supporting this Association. Every veterinarian should become an active member. To this end an active membership campaign was launched in Pennsylvania with gratifying results.

The good work of the Horse Association during the past year will no doubt be fully appreciated by the American Veterinary Medical Association, and it is hoped it will again actively lend its support to this work and appoint a member to represent it on the advisory board of that organization.

G. A. DICK.

PRESIDENT WHITE: What shall be done with this very excellent report?

(It was voted, on motion of Dr. Koen, duly seconded, that the report be accepted.)

REPORT OF COMMITTEE ON NECROLOGY

PRESIDENT WHITE: I will now call for the report of the Committee on Necrology, Dr. Connaway, chairman.

DR. CONNAWAY: I regret that we can not make a full report at this time. Some of the members of the committee to whom part of this work was assigned have not reported, but we will get the full report and file the data with the Secretary.

It seems to me appropriate at this time to have a little memorial service in honor of some of our distinguished members who have died during the past year. Dr. W. Horace Hoskins, Dr. James Law, Dr. E. A. A. Grange and Dr. F. S. Musselman. It has been suggested that Dr. Moore say a few words in regard to Dr. Law; that Dr. Adams speak concerning Dr. Hoskins; that Dr. Mayo and Dr. McGilvray say a few words in regard to Dr. Grange; and that Dr. Dimock respond for Dr. Musselman.

PRESIDENT WHITE: You have heard the suggestion of the Chairman of the Committee on Necrology. Is Dr. V. A. Moore here?

TRIBUTE TO DR. JAMES LAW

DR. V. A. MOORE: Those of us who have known Dr. Law, who have been his students and who have worked with him, have come to know the breadth of his knowledge, the interest he had in his profession and the sympathies he entertained for those who are striving to fit themselves for veterinary work.

Dr. Law was born in Edinburgh, Scotland, in 1838. He was graduated from the Veterinary College of Edinburgh. Following his graduation he studied human anatomy under William Turner and surgery under Joseph Lister, the father of antiseptic surgery. Later he studied at the great veterinary colleges of Lyons and Alfort. About 1860 he became professor of veterinary anatomy, physiology and materia medica in the New Veterinary College of Edinburgh and its continuation in London as the Albert Veterinary College. Besides his teaching, he practiced his profession in Scotland, in England, and for one year in Belfast, Ireland.

In 1868, at the solicitation of the Hon. Andrew D. White, he came to Cornell University to accept the position of professor of veterinary medicine and surgery. He was a member of the original faculty of the University and one of its most esteemed and influential men. He occupied the position as head of the department of veterinary science in the University until 1896, when he became director of the New York State Veterinary College established at the University, which position he held until 1908, when he retired at the age of seventy.

He was appealed to by both the State and Federal Governments in connection with the study and control of serious diseases of domesticated animals. He was a pioneer in America in putting veterinary medicine on a sound scientific basis. He gave valuable assistance to the Federal Government by his investigations in connection with hog cholera. Later he was sent by the United States Department of Agriculture as its representative to the International Veterinary Congress at Brussels, Belgium. He took an active part in the eradication of contagious pleuropneumonia from the United States.

Dr. Law was a thorough student. He was also an extensive writer on veterinary topics. For many years he was an authority in practically all branches of the science. He was skilled in diagnosis, a thorough anatomist and a successful surgeon. In addition to the valuable work he did as an investigator and practitioner, he was an inspiring teacher. There is no more effective inspiration than that which has come from the work and life of Dr. Law, who, through his genius, his devotion to truth and his kindly acts, has demonstrated the power of man to succeed as a gentleman, a scholar and a leader. He exemplified the simplicity of success in righteous living and faithful, honest endeavor.

Dr. Law recognized that the animal husbandry of this country would soon require the services of a large number of scientifically trained veterinarians to combat the numerous destructive diseases of livestock that were beginning to gain a foothold here. He stood for higher veterinary education and adequate livestock sanitation. By his influence and personal efforts, the first State-supported veterinary college was established. Through his students of earlier years, over whom he had a profound influence, the Federal Bureau of Animal Industry was organized in 1884, and livestock sanitary boards were created.

Dr. Law was an idealist whose purpose and ambition in life has been the advancement of a cause rather than self. Like the great Pasteur, the work he was advancing stood between himself and the public. His pupils remember him as a master and also a man possessed of much human sympathy. With all his greatness he was a manly man with a sweetness of disposition rarely found among men. He will go down in history not only as a scholar, teacher and leader, but also as a man of kindness, courage and truth.

TRIBUTE TO DR. W. HORACE HOSKINS

PRESIDENT WHITE: Dr. Adams will speak in respect to the late W. Horace Hoskins.

DR. ADAMS: Last night, Dr. Connaway, Chairman of the Committee on Necrology, asked if I would say a few words in memory of Dr. Hoskins. I suggested that there were other men who had been more closely associated with him than I, and who possibly could more appropriately speak for him, but that weak argument was overruled, and I will not try to evade what I consider is a duty.

I am not familiar with all the salient facts in his professional life, but I knew the man as a man, and as such I would try to present him to you. He graduated from the American Veterinary School early in the eighties and pursued practice continuously in Philadelphia until some two years ago, when he accepted the presidency of the Veterinary College of the University of the City of New York.

His one passion in life, it seemed to me, was to organize the veterinary profession into working societies. He did not contribute anything notable in the way of veterinary discoveries. He was not an outstanding practitioner, but he was outstanding in exemplifying the passion I have spoken of—the passion for getting old and young veterinarians together and getting them acquainted, organizing and inaugurating laws for better control of the profession and better relations between the profession and the public. That has been his life work. He has attended continuously, I believe, thirty-eight meetings of the A. V. M. A., has not missed one year in thirty-eight or possibly thirty-nine. He

has held nearly every position of honor in this Association. He was for many years Secretary of the A. V. M. A. He was always a prominent member upon its Legislative Committee. He gave of his time unstintedly, I believe, more than any man who has ever belonged to this American Veterinary Medical Association. Night and day, early and late, he had it in his mind. As I said before, it was a passion with him. Now that he is gone, I hope somebody will be raised up to carry on his work in the spirit in which he carried it on. He meant a great deal to this Association in its early days, and from now on we shall miss him. (Applause.)

TRIBUTE TO DR. E. A. A. GRANGE

PRESIDENT WHITE: Dr. Mayo will pay tribute to the late Dr. Grange of Toronto.

SECRETARY MAYO: When I became a student of Michigan Agricultural College in 1884, Dr. Grange was giving lectures on veterinary science in that school. I think he had recently come from Minnesota, where he had lectured for a time at the University of Minnesota. As a farm boy I was quite interested in horses, and Dr. Grange was a typical Englishman in his love for animals and particularly for horses. It was a mutual interest that brought us together in a way, and it was largely through his influence that I took up the study of veterinary medicine. I was under him a year as a student, and after I had completed my veterinary course I was appointed his assistant and was intimately associated with him for two years. He was a most delightful man to be associated with. I never had to ask him for anything; he always asked you if you wouldn't like so and so. He was a perfect gentleman, a pleasing lecturer, and I remember was several times voted by the students the most popular professor in college. He was instrumental in getting through the Legislature of the State of Michigan the law providing for a State Veterinarian, and he was the first man appointed to that position under the law, and held it, I believe, until he resigned in 1897 to go into other work.

I have always had the highest regard for Dr. Grange because of his sympathy and his perfect gentlemanliness. He was born in England, and came from a very fine family, but he was educated largely in this country; was a graduate of Ontario. He was a very witty man, in a dry way, and those of you who had the opportunity of hearing him in California in 1910 extend an invitation to this Association to hold its next meeting in Toronto will recall the incident when he said he wasn't an orator, although he apparently attempted a little on this occasion. He said he wanted them to understand that Canada had mountains that reached to the skies, she had rivers hundreds of miles wide and millions of miles long, and, he said, "there is water in 'em." It wasn't so much what he said as the way he said it.

It was my privilege a few years ago to call on him at his home in Toronto. He was paralyzed, helpless, unable to speak; and yet the same merry twinkle was in his eye as always. (Applause.)

PRESIDENT WHITE: Dr. McGilvray of the Ontario Veterinary College will pay additional tribute to the memory of Dr. Grange.

DR. MCGILVRAY: Needless to state at this time, it was considerable feeling that prompted me to accede to Dr. Connaway's request that I should also bear testimony in regard to Dr. Grange. I fully appreciate the sentiments that have been expressed by Dr. Mayo here regarding the late Dr. Grange.

I was associated with Dr. Grange very closely since the year 1908, and during that time I learned to like him and to love him very much. The fact is that at the first glance one was apt to misjudge the late Dr. Grange. He probably hadn't acquired that gift which some have of immediately ingratiating himself into the presence of a stranger. He was somewhat reticent; the fact is, he was reticent to a degree; but as you became more closely acquainted with him you got to know him better and then found out that underneath the surface there was a great deal of warmth and humanness that, after all, meant a great deal.

In the later years of his life Dr. Grange did much for the veterinary profession and veterinary education as a whole. He undertook to take care of the Ontario Veterinary College at a time when it was being transferred from private ownership to state or government control. One can imagine the difficulties one would encounter under such circumstances. Previously this institution had been run privately, and the owner of the place, like the centurion of old, could say to his people, "Come," and they came, and "Go," and they went. Now, to be supervisor of an institution of that kind under government auspices you have to be guided by legislation. Dr. Grange succeeded in having proper legislation enacted governing the college, and through the work he did in that regard he has been able to show a clear vision for the future.

Dr. Grange was held in very high esteem by the student body. They got to know him and to like him, and I must say that in all those years I have never yet been able to find the student who could say otherwise than that Dr. Grange was a gentleman.

In the year 1918 he had reached the allotted span of sixty years of age, under which the Government requires all Government service to be terminated. Dr. Grange in that year was retired and superannuated. We still continued to have him, however, closely identified with the college. He felt so bound up in the work, even while he wasn't required to be at the college at all, that he came to that institution every morning at 9 o'clock sharp. I never knew Dr. Grange to be late; I never knew him to

fail to keep an appointment and be on time. It is well for us young chaps to keep in mind that punctuality is a great thing. Through the whole year he continued to take active interest and devote his entire time to the work of the college.

Unfortunately, he was attacked with what we ordinarily call a stroke. During the previous year he suffered from an injury he received through falling from a horse. When he became bedridden, I found him, as Dr. Mayo said, game to the core. I will say for Dr. Grange, if ever a man was game even in sickness, it was Dr. Grange. I saw him a few weeks before his death, and he was the same cheerful old fellow, always wanting to know if there was something he could do. He was a real gentleman and one of Nature's kind. (Applause.)

TRIBUTE TO DR. S. F. MUSSELMAN

PRESIDENT WHITE: Dr. Dimock of Kentucky will speak in memory of the late Dr. Musselman.

DR. DIMOCK: I know there are a number here who knew Dr. Musselman for a longer time than I did, and are therefore better prepared to speak on this occasion. Some of you will remember that there was a memorial of the late Dr. Musselman at the meeting of the United States Livestock Sanitary Association last December, and I would suggest that some of the things that were said at that time regarding his life work be used by the Committee on Neerology in its report to this Association. At this time I can only repeat a few of the points that were made then.

As you know, I have been in Kentucky only a little over two years, and while I had met Dr. Musselman at Association meetings, my acquaintance with him dates from July 1, 1919. Therefore what I say is from my own brief acquaintance with him and what I hear from those who knew him for a longer time. His work in the profession was that of a practitioner and State official. Of his activities in the profession we hear nothing but praise, and it seems that as time goes on, since his death, those who knew him best realize more and more the value of the man in his work. I am well acquainted and come in contact almost daily with some of the members of the Livestock Sanitary Board of Kentucky, and very frequently during the past few months, different ones have remarked to me how they miss him in the work. He was the leader of the Livestock Sanitary Board of Kentucky, and the members of that board had come to depend upon him as an adviser in directing them in their field of activity.

Dr. Musselman was an ideal man to work with and appreciated fully the value of cooperation. In our work at the university on animal diseases, friction with the State Department at Frankfort has been unknown; quite to the contrary, we could always depend upon Dr. Musselman for support. The men who were

under him as assistant State veterinarians looked upon him as a friend and adviser, much as young men look to their fathers for counsel.

The veterinary profession of the State of Kentucky felt that in Dr. Musselman they had a man whom all could accept as the type of professional representative of the best of our profession. He was the standard bearer of the profession in Kentucky. We miss him and honor his memory. (Applause.)

PRESIDENT WHITE: It would seem appropriate to close this little memorial service by having us stand as a body and in silence until you hear the fall of the gavel. These were eminent men, eminent fellow members who have passed from among us, who can never meet with us again, and on this earth at least whose faces we can never see again. I therefore ask you to stand in silence for a few moments.

(The audience arose and stood in silence for a few moments.)

GREETING TO DR. ARCHIBALD

DR. BENNETT: If it is in order at the present time, I would like to suggest that this Association now assembled in Denver send a telegram of greeting to Dr. Archibald, who has been unable to attend our meetings for the past two or three years on account of illness. He is a member of the Executive Board from the Fifth District. I think it would be well at this time to have the Secretary send a telegram of greeting to Dr. Archibald at his home.

(The motion was seconded by Dr. Kiernan and carried.)

REPORT OF THE COMMITTEE ON BOVINE TUBERCULOSIS

PRESIDENT WHITE: Is the Committee on Bovine Tuberculosis ready to report?

(Dr. Cotton read the report of the committee, as follows:)

Bovine tuberculosis, notwithstanding the long fight that has been directed against it, continues to hold its unenviable, high rank among the costly infectious diseases that plague our food-producing animals. But this should not discourage our efforts to combat it, as the dangers and losses for which it is directly and indirectly responsible have never before been better recognized by those who are interested, through either altruistic or selfish motives, in the conservation and perfection of the animal sources of our food supply, and the eradication activities of our Federal and State Governments have never been more active or promising. The outlook is so encouraging that we should unitedly try to dispel the gloom that too often clouds discussions on eradication, by cheerfully teaching that tuberculosis among animals can be wholly and permanently suppressed, and that we are moving toward its suppression as rapidly as the available men and means permit.

We should not assert or claim that the end can be reached in a year or two, because that would encourage false hopes and tend to discredit our judgment. The eradication of a disease which, in the United States alone, concerns more than 23 million dairy and nearly 43 million other cattle, requires time, and the relatively small number

of competent men who can be called on to test and examine this vast multitude of animals, even if unlimited sums of money were available, would prove an important factor in determining the rate at which progress can be made.

In addition to money and trained men, eradication also requires the proper education of livestock owners, on whom dependence must be placed more and more in the future, as the number of cleaned herds and areas increases to protect such herds and areas against reinfection. Without the aid, interest and good will of the livestock owners it is questionable whether a widespread, common, insidious, usually chronic, often long-concealed disease like tuberculosis can be conquered, as it is their authority through which the enforcement of many primely necessary measures must be secured.

The following important facts about bovine tuberculosis and its eradication should be widely published:

a. The bovine tuberculosis eradication work that is now being done is encouraging, and the results that are being obtained promise to be permanent.

b. The officers of the Federal and State cooperative tuberculosis eradication activities now are receiving more requests from cattle owners who desire to have their herds accredited free from tuberculosis than they can attend to with the men and money at their command.

c. The sooner bovine tuberculosis is eradicated the less the work will cost, and the sooner the losses it causes will stop.

d. The frequency of tuberculosis among the cattle of a country is closely proportioned to its number of cattle and the period of time the disease has been permitted to spread without a real fight to control it, and an effective fight is impossible without the use of tuberculin.

e. Before tuberculin was discovered tuberculosis probably had reached nearly, if not quite, its present frequency among European cattle, which is from three to five times as great as among American cattle. A comparison between our older and younger States shows that the percentage of tuberculous cattle is from 25 to 30 times as great in some of the older than it is in some of the younger.

f. Eradication of bovine tuberculosis in Europe, because of the much larger proportion of infected cattle, is a decidedly more difficult and expensive thing than it is in America. We should not permit the cattle in our older States to become as commonly infected as those of Europe, or those in our younger States in this respect to equal those in our older States. Indifference and dilatoriness will be perniciously effective in bringing about such undesirable conditions.

g. A half-hearted, poorly financed campaign against bovine tuberculosis is not sufficient, as it does not promise, to judge from experience, to remove existing cases and centers of infection as rapidly as new ones develop.

h. The losses caused by bovine tuberculosis may fall more heavily on some persons than on others, but they are finally paid by the people as a whole, as the disease increases the price of all beef and dairy and pork products. If the increases were payable in a lump sum, once per annum, in the place of being paid, as is now the case, in one or more daily installments, the eyes of those who are being taxed probably would open wide with wonder.

Recognizing the truth of these statements, and using them as a basis, the committee recommends that the following resolution be approved by the Association:

"Whereas, Bovine tuberculosis is a widespread and destructive plague of cattle and hogs, and is, moreover, responsible for many cases of tuberculosis among children;

"And whereas, The excellent work now being done to eradicate this plague is being hampered by lack of funds and for some time to come will require annually increasing sums of money to insure that it may keep pace with the requests received from cattle owners to have their herds cleaned and accredited free from tuberculosis:

"Be It Resolved, That the members of this Association, who may be assumed to be peculiarly qualified, through education and the nature of their work, to understand the conditions that affect the welfare of the animal industry and the prices of food products obtained from animals, believe it to be their duty to point out that it is urgently desirable that all Federal and State appropriations for the eradication of bovine tuberculosis should be annually increased, and that the annual increases should be sufficient at least to meet the growing demand of cattle owners for reasonable help to stamp out the disease in their herds;

"Be It Further Resolved, That this resolution shall have the widest possible distribution, either or both by being mailed to members of legislatures or by being published in livestock and agricultural journals."

The resolution should be distributed from the office of the President or Secretary of the Association, and if this requires some expenditure, an appropriation for the purpose is recommended and should be made.

The last annual report of the committee included a number of recommendations, the approval of which imposed special tasks on the committee of this year. The first deals with the intradermal use of tuberculin as a test for tuberculosis. Studies of the test were to be made and a questionnaire sent to all the members of the Association, and by such means it was hoped the needed information would be obtained for the preparation of a definition of what actually constitutes an intradermal tuberculin reaction. As no money was appropriated for the preparation and distribution of the questionnaire, the expedient of publishing it, with a request for attention, in the JOURNAL of the Association, was used. (See JOURNAL of the A. V. M. A., April, 1921.) Though it could not be expected that the expedient would yield as many replies as a questionnaire mailed separately to each member of the Association, it would be a serious matter if the meager number received could be looked upon as an index of the interest American veterinarians take in matters intimately and importantly related to the eradication of tuberculosis among domestic animals: and when you know that the total number of replies lacks one of being half a dozen, you will admit the truth of this statement. The committee takes pleasure in expressing its thanks to the five men who troubled themselves to show their interest in its questionnaire. However, it does not deem it advisable to draw and publish conclusions from so few reports.

Among veterinarians who have had considerable experience with the different methods of using tuberculin the belief is often expressed that it is urgently necessary that the method of making the intradermal test should be standardized, and that, if this were done, many errors now charged against it would be eliminated. The needles and syringes used, the amount and strength of the tuberculin injected, the examination and preparation of the skin before injection, the depth of the injection, the hours of examination, etc., all are factors of importance.

The approval of the intradermal tuberculin test by the Association as one of the means of detecting tuberculous animals is recommended.

The code for recording and reporting the results obtained by testing cattle intradermally with tuberculin, adopted by the United States Livestock Sanitary Association, should also be adopted by this Association, and it is recommended that this action be taken. Though

some objections have been made against the code, it is questionable whether they have sufficient weight to justify the confusion which would result from the adoption of different codes by the two most important American associations concerned with the protection of animals against infectious diseases.

Another recommendation made by the Committee on Tuberculosis at the last annual meeting is a revision of the report of the International Commission on the Control of Bovine Tuberculosis published in 1910 and the preparation of a primer on bovine tuberculosis. Whether this recommendation was to be construed as imposing a task on the committee of this year is a matter about which its members are not in full accord. The work, however, has not been undertaken, and if it is the intention of the Association to have it done it is recommended that a special revision and primer committee be appointed to do it.

Recommendations were also made by the committee of last year regarding so-called no-lesion tuberculin reactors. It is with considerable satisfaction that something can be said on this subject which may prove of interest. During the year ending June 30, 1921, the Pathological Division of the Federal Bureau of Animal Industry examined material obtained from 1,296 cases of no-lesion reactors, and found acid-fast bacilli in all respects like tubercle germs, in 258, or virtually 20 per cent. The material examined was mostly congested lymph glands and glands showing small hemorrhagic areas. Such glands are not uncommon in nontuberculous slaughtered animals, hence the significance of the proportion of cases in which tubercle bacilli were found should not be taken as proving that only one-fifth of the no-lesion cases have been satisfactorily explained, but rather as evidence that tends to justify the belief that so-called no-lesion reactors, with possibly rare exceptions, are infected with tubercle bacilli.

The insidious, chronic character of tuberculosis should naturally prompt us to draw the conclusion that a delicate, highly efficient diagnostic agent like tuberculin would detect a fairly large number of cases before the lesions had become gross enough to be visible to the unaided eye.

Consider how difficult it is to select material from no-lesion tuberculin reactors for microscopic study. A small fragment of tissue suffices for many preparations of the kind that can be examined under the high magnification required for the detection of tubercle bacilli, and the fragment, less than a grain, is part of an animal that rarely weighs less than several hundred and often more than a thousand pounds. To have proved, actually proved, that 20 per cent of 1,296 no-lesion tuberculin reacting cattle were actually infected with tubercle bacilli, if the difficulties in the way of obtaining the proof are duly valued, is either an astonishing technical achievement or the strongest kind of evidence to support the conclusion that most so-called no-lesion reactors are infected with tubercle bacilli and must be looked upon as dangerous animals that may sooner or later become spreaders of tuberculosis. Those who are inclined to doubt this interpretation should go to friends or acquaintances who have hunted tubercle bacilli in recognizable tuberculous lesions, and learn from them that their discovery in even such lesions too often is an eye-wearing, tedious, time-consuming task.

It may be interesting to say here that sensitization to tuberculin can be induced in cattle and small experiment animals by injecting them with dead tubercle bacilli, and that dead tubercle bacilli until recently were of not rare occurrence in tuberculin. Whether their abundance occasionally was sufficient to sensitize cattle that received large subcutaneous injections of tuberculin has not been determined.

Cattle can be sensitized also by drenching them with human tubercle bacilli, or by injecting them with lesions caused in guinea-pigs by human tubercle bacilli. Such bacilli, as is now well known, do not cause an active or a progressive tuberculosis in cattle. What the value of these facts may be in accounting for some no-lesion reactors can not be answered until further studies have been made.

The question has been asked whether an animal may be sensitive to tuberculin as the result of previous injections. The answer to this is that though many tests have been made with different species of animals, no one has succeeded in showing that injections of tuberculin sensitize an animal to subsequence injections.

As we well know, one of the disadvantages of the subcutaneous use of tuberculin is, wholly contrary to the sensitization of nontuberculous animals to subsequent injections, that it too often leads to the desensitization of tuberculous animals. Such desensitization, unless some means can be devised to give the slogan, "Once a reactor, always tuberculous" practical value, makes it possible for dangerous tuberculous animals to remain unrestrained and unrecognized and to serve as unsuspected disseminators of tubercle bacilli. The Association, or a committee appointed by the Association, should give this matter careful study, and seek means through which it can be determined with reasonable certainty when an animal is examined whether it has at any time reacted with tuberculin. The suggested committee, if appointed,—and its appointment is hereby recommended,—should not be the Committee on Tuberculosis, and the men selected for it should be well informed on practical methods of marking animals and should know how to obtain the support of livestock interests to further the use of a workable method for identifying dangerous animals.

Another resolution in the report of the committee of last year,—a report, by the way, that imposed a good many large tasks—recommended that a study should be made of the causes of the recurrence of tuberculosis in cleaned herds. Such recurrence is a subject on which probably any member of the committee could present a long dissertation, which, however, as it would contain little or nothing new, would be tedious rather than instructive. Two things are very important; one, that we should guard clean and cleaned herds against cattle that have become tolerant to tuberculin; and, two, that we should carefully study the cleaned herds under our supervision relative to the simple, discoverable means through which they may be reinfected. That a stream of water, for instance, may carry tubercle bacilli a considerable distance from an infected to a clean or a cleaned herd and lead to the development or recurrence of tuberculosis is a fact that has been experimentally proved. That flies, rats, mice, birds, currents of air, etc., serve as agents to spread tuberculosis has not been proved, though definite investigations to incriminate them have been made. It has been proved that flies that live in a tuberculous environment may harbor tubercle bacilli in and on their bodies, and that the same is true of rats, mice and birds which have ingested tubercle bacilli or tuberculous tissues; but if these were important causes for the spread of tuberculosis among cattle, it would not have been possible, as has been done at various places, to maintain actively tuberculous cattle on a small area with nontuberculous, without the spread of the disease from the former to the latter.

The Committee on Tuberculosis, which is clothed with the dignity reflected from the inclusion of a wholly superfluous adjective, "International," in its name, owes its existence to a recommendation made by the "International Commission on the Control of Bovine Tuberculosis" appointed by the Association in the year 1909. One of the principal functions of the committee, defined in the recommendation which called it into existence, was to report to the Association from

time to time the discoveries made by investigators engaged in the study of tuberculosis. It therefore seems pertinent and desirable that a few words should be said, before closing this report, about the claims made in the course of the year by Calmette and Guérin in France and Nathan Raw in England that they have succeeded in producing attenuated strains of tubercle bacilli which may prove, or are alleged to have proved, serviceable for use as immunizing and therapeutic agents in the fight against tuberculosis.

As early as the years 1894 and 1896, attention was called to an originally virulent strain of the tubercle bacillus which had become attenuated through growth on artificial culture media, and which was proved to induce a measurable degree of resistance against tuberculosis in guinea-pigs injected with it and subsequently injected with virulent tubercle bacilli.

A number of years later, as you will remember, we passed through the period of so-called bovo-vaccination against tuberculosis. Bovo-vaccination may be likened to the use of attenuated tubercle bacilli to obtain immunity against more virulent strains, as it required the injection of cattle with bacilli of the human type, against which they are normally resistant, to protect them against the bovine type, for which they are highly susceptible.

More recently we were subjected to the Friedman turtle-bacillus fiasco. The turtle germ, for which specific therapeutic qualities of an antituberculous character were claimed, was nothing more nor less, so far as we know, than a bacillus of the human type of very low pathogenic virulence which had been isolated from a turtle that had been exposed in a zoological garden to the expectorations of a human tuberculous individual. And, incidentally, it may be worth mentioning, after years of study and observation, a hot quarrel is still in progress in Europe concerning the value of Friedman's turtle bacillus as an agent for the treatment of tuberculosis.

The object of referring to this earlier work is to call to your minds that the use of attenuated, avirulent and aberrant or unusual strains of tubercle bacilli as immunizing and therapeutic agents is by no means new, and to justify the opinion that the claims made by Calmette and Guérin and by Raw, notwithstanding that these are men of the highest rank in the field of tuberculosis research, must not be lightly accepted as a final solution of our tuberculosis problems.

When we realize that tubercle bacilli may lie dormant, without losing their virulence or changing their character, for months and years in the bodies of animals for which they are not truly pathogenic, we may say: In Europe, if live tubercle bacilli can be used with a fair degree of safety to protect cattle against tuberculosis, because of the great frequency of tuberculosis among European cattle, it may be a reasonable expedient to use them. But in America, with its much smaller proportion of tuberculous cattle, it is to be hoped that we will resort to no method of control or eradication that requires the injection of living tubercle bacilli of any kind, type, degree of virulence or degree of attenuation, at least not until the injection of such bacilli has been proved by searching, exhaustive experimental studies to be, on the one hand, harmless, and, on the other, truly and economically beneficial. In America our aim should be total eradication, and no better path to this end has been defined than that along which our cooperative work between the Federal and State Governments is moving.

E. C. SCHROEDER, *Chairman*.
CHARLES E. COTTON,
CARL W. GAY,
M. H. REYNOLDS,
FREDERICK TORRANCE.

PRESIDENT WHITE: We have just heard a very valuable report from the International Committee on Bovine Tuberculosis. What shall be done with it?

DR. KIERNAN: I am in favor of the resolution and propose to vote for it. I merely rise to make the observation that I notice that less than half a dozen replies to the questionnaire were returned to the committee. I don't like to have the impression go out that that indicates the sentiment of the veterinarians on the tuberculin test. From October 1 to June 30, 1921, there were tuberculin tested by the subcutaneous method 251,000 cattle, of which 10,000 animals reacted; by the intradermic test 648,697 head of cattle, of which 24,554 reacted to the tuberculin test. The percentage of reactors by relative tests was relatively the same, indicating that the intradermic test is used quite generally throughout the United States. I hold no brief for either one. These are cold facts and figures for the work being done.

Another observation I wish to make is with regard to lesions. The report of July, 1921, shows that of 137,000 head of cattle tuberculin tested in cooperative work, 302 animals were found to disclose no microscopic lesions, representing 6.57 per cent of those showing no lesions. I think that will compare favorably with all the data that have been gathered annually from the beginning.

I move that the resolution be accepted.

(The motion was duly seconded and carried.)

AMENDMENT TO BY-LAWS

PRESIDENT WHITE: Is there any unfinished business?

SECRETARY MAYO: There is a minor change in the By-Laws that was proposed at Columbus last year. It was to change Article I of the By-Laws on the order of business, placing the reports of officers as No. 7, before the election of officers, instead of afterwards as it is at present. We have not followed this plan, but it is a minor change.

PRESIDENT WHITE: You have heard the statement of the Secretary in regard to this minor change in the By-Laws. What is your pleasure in regard to it?

DR. COTTON: I move its adoption.

(The motion was seconded and carried.)

SPECIAL COMMITTEE ON PREVENTION AND CONTROL OF ANIMAL DISEASES

PRESIDENT WHITE: Is there any new business?

DR. CARY: I move that a special committee of not more than five members be appointed by the President to report at the next meeting of the A. V. M. A. on "The Prevention and Control of Animal Diseases," along the lines suggested by Dr. Muncie in

his paper on that subject before the Section on Sanitary Science and Police.

(The motion was seconded and carried.)

PLACE OF NEXT MEETING

DR. ELIASON: Would it be appropriate at this time to extend an invitation to the Association for next year's meeting?

PRESIDENT WHITE: I presume it would not be out of order.

DR. FERGUSON: Last July, at the meeting of the Wisconsin Veterinary Medical Association, I was delegated to extend you an invitation to meet at Madison, Wisconsin, next year. It is needless for me to describe the advantages that you will have in meeting in Wisconsin. Nearly all of you are familiar with that State. The only question that might come up in your minds is as to having facilities to house you there, and I can assure you we have ample facilities to take care of every member and visitor if you decide to meet there. We can put up a program that will be of special interest to the practising veterinarians. As you all know, Wisconsin is the leading dairy State in the Union, and Madison is so located that you may have the opportunity to look over some of the best bred and some of the best individual dairy cattle in the world. Dr. West, one of the local men in Madison, is famous for getting together a clinic. I can assure you that if you meet there no one will be dissatisfied with the size and the quality of the clinic that we can give you.

In behalf of the Wisconsin Veterinary Medical Association I extend the invitation to meet with us next year. (Applause.)

PRESIDENT WHITE: I do not believe it would be wise at this time to commit ourselves finally in regard to our next place of meeting. Personally, I am very much in favor of what the last speaker said, but we will receive invitations from other parts of the country and it would hardly be fair to them not to allow them to be heard. I understand that all of the representatives have not yet arrived. However, use your own pleasure in the matter and not mine.

DR. ELIASON: Just in further invitation from the city of Madison, and on behalf of the Board of Commerce and the Department of Agriculture, of which I am a part, we extend to you cordially an invitation to visit the city of Madison. We have one of the most splendid capitals in America, and we are so situated that we can give you a good time. Some questions have arisen as to whether we are equipped with hotel facilities. They are not elaborate, but I assure you that you will be taken care of. We have made arrangements so that we know just where we can be if you come. Every room in Madison has a bath. All you have to do is to bring your bathing suit. You can step right off into the lake. We have four lakes right in proximity to Madison. If you want to fish in the morning or in the evening facilities will

be provided so you may. I also extend, on behalf of the Governor, an invitation to visit our State.

DR. CARY: I move that this question be laid on the table until all the invitations are in.

DR. JENSEN: Could they not be presented at this time?

PRESIDENT WHITE: They are not all here.

DR. FERGUSON: Mr. President, it was not my intention to have this invitation accepted at this time. I wanted to get it before the members while they were all present.

DR. STANGE: I think perhaps an amendment would not be out of order. It seems to me the proper way to handle this would be to refer this invitation, together with any others that may be received, to the Executive Board. I move that this invitation, together with any others that may be received, be referred to the Executive Board for their action.

(The motion was seconded by Dr. Cary.)

PRESIDENT WHITE: Dr. Cary's motion to lay this on the table was not seconded, so Dr. Stange's motion holds.

DR. KOEN: I believe that Dr. Stange speaks correctly when he says that the meeting place shall be decided upon by the Executive Board, but I believe that it has been the custom in previous years to give the Association an opportunity to express its preference. I don't think that it is fair to those who are here or to the people that have invited us to Madison and Wisconsin to refer this invitation to the Executive Board without an opportunity of the members assembled here to express their preference. If this motion can be so amended that this Association or convention shall have an opportunity, before it adjourns, to express its preference in the matter, then I am satisfied to let it go over; but I don't believe the motion should carry to dispose of Madison finally by referring it definitely to the Executive Board. I hope that the question will be voted down.

DR. CARY: I would like to call for the reading of the Constitution and By-Laws on this question.

(Secretary Mayo read from the Constitution and By-Laws governing meetings of the Association.)

DR. JENSEN: I am mighty happy that for once I can agree with Dr. Koen. This idea of everything being referred to the Executive Board reminds me of the fact that somebody called it the executing board. I believe we should have a little voice in this matter.

DR. KIERNAN: Since 1910 when this question was discussed in New York as to whether the date and place of the meeting should be fixed by the Executive Board or the membership the question has never arisen, but the Association has the perfect right to fix the place for holding the meeting. As I understand this, it is not for the Executive Board to dispose of the matter, but to give opportunity to others to extend invitations to hold the meeting

next year. There are other places that have in mind extending an invitation to this Association, but they understand it is handled by the Executive Board. Wisconsin has an equal opportunity with any other city or State before the Executive Board. I think that is fair enough.

DR. KOEN: All these other towns have had an equal chance with Wisconsin to extend an invitation. I am not asking at this time that the other cities that want to invite us be not given an opportunity, but I do ask that Dr. Stange's motion be voted down in order that the convention may have opportunity to voice its preference as to where we shall meet. If Dr. Stange's motion carries, this Association shall have no voice in the matter whatever, but all the other invitations that come will be referred to the Executive Board.

DR. CARY: I move we postpone this until all the invitations arrive.

(The motion was seconded.)

PRESIDENT WHITE: Is that an amendment to the motion or a substitute motion?

DR. CARY: I move that this question under discussion be postponed until all the invitations have arrived. I suppose it is an amendment.

DR. JENSEN: I would like to see embodied in that motion a provision that this be decided by the Association and not by the Board.

PRESIDENT WHITE: The motion comes on the amendment by Dr. Cary.

(The amendment was carried.)

PRESIDENT WHITE: Now we will vote on Dr. Stange's motion as amended.

(The motion as amended was carried.)

Adjournment.

NEW COMMITTEES OF THE A. V. M. A.

The following appointments have been made by President A. T. Kinsley:

Committee on Legislation.—J. G. Ferneyhough.

Committee on Resolutions.—D. M. Campbell, chairman; C. H. Stange, V. A. Moore, Geo. H. Glover, R. R. Dykstra.

Audit Committee.—R. P. Marsteller, chairman; O. J. Kron, G. A. Scott, A. Lockhart, J. V. Laeroix.

Committee on Necrology.—H. E. Bemis, chairman; J. W. Conaway, A. H. Baker, W. B. Craig, G. A. Johnston.

Committee on History.—J. W. Adams, chairman; R. C. Moore, G. H. Berns, T. H. Edwards, C. D. McGilvray.

Committee on Anatomical Nomenclature.—S. Sisson, chairman; H. S. Murphey, Mark Francis, Earl Sunderville, F. W. Chamberlain.

International Committee on Bovine Tuberculosis.—J. A. Kieran, chairman; Luis Santa Maria, F. Torrance, C. E. Cotton, W. T. Spencer.

Committee on Abortion.—C. P. Fitch, chairman; E. C. Schroeder, F. M. Hayes, A. Eichhorn, T. H. Ferguson.

Committee on International Veterinary Conference.—J. R. Mohler, chairman; A. Eichhorn, L. A. Merillat, David S. White, V. A. Moore, F. Torrance.

Salmon Memorial Committee.—S. Brenton, chairman; H. Preston Hoskins, J. R. Mohler, J. G. Rutherford, H. M. Graefe.

Liautard Memorial Committee.—J. F. DeVine, chairman; W. H. Lowe, W. G. Hollingworth, A. D. Knowles, W. H. Dalrymple.

Committee on Emblem.—S. E. Bennett, chairman; R. F. Bourne, J. F. McKenna.

Committee on Prevention and Control of Animal Diseases.—H. W. Turner, chairman; L. G. Cloud, U. G. Houck, G. H. Hart, I. E. Newsom.

Representatives on Revision of Narcotic Law.—J. P. Turner, chairman; R. R. Clark.

Representative on Board of Managers, Horse Association of America.—Geo. A. Dick.

Representative American Research Council Committee.—L. W. Goss.

NEW MEMBERS

Membership cards have been sent to all the newly elected members together with an application blank and a letter urging them to make a special effort to get a new member. With their enthusiasm for the A. V. M. A. we are expecting good returns. How many members will make a personal effort to get one veterinarian to join our association? It would double our membership.

The Secretary has written to some English veterinary journals calling attention to the advantages of joining the A. V. M. A., and it is hoped that some of our confreres on the other side will respond.

The Secretary has received a letter from Dr. Gabriel Malda, Secretary of Public Health of Mexico, thanking the A. V. M. A. for courtesies extended to Dr. Luis Santa Maria, the official delegate from the Republic of Mexico to the Denver meeting. Dr. Santa Maria joined the A. V. M. A. at that meeting.

An application for membership has been received from Dr.

J. E. Aghion Bey, Principal Veterinary Officer, State Domains, Sakha, Egypt. He is a graduate of the Ontario Veterinary College in 1907.

VETERINARY ASSOCIATION OF MANITOBA

A special meeting of the members of the Veterinary Association of Manitoba was held in the Royal Alexandra Hotel, Winnipeg, Tuesday evening, September 27, 1921, for the purpose of discussing questions of importance to the livestock industry and also Dominion-wide registration of veterinary surgeons in the Dominion of Canada, and for the appointment of a delegate to attend a conference of veterinary surgeons to be held in Ottawa in November.

The chair was occupied by the President, Dr. F. W. Bryant, and the following members were present: W. J. Hinman, R. A. McLoughry, W. A. Shoults, W. Hilton, J. A. Stevenson, J. A. Munn, H. R. McEwen, N. V. James, H. Bradshaw, A. L. Alton, G. B. Miller, G. A. Bowman, W. A. Hilliard, J. G. MacDonald, H. C. Storey, H. Colebourn, J. W. Smith, S. H. Kesten and J. B. Still.

A lengthy discussion took place regarding matters of importance to the livestock industry and the Dominion-wide registration of veterinary surgeons. It was moved by Dr. Hinman, seconded by Dr. Bradshaw, that a committee composed of Dr. McLoughry, Dr. Shoults and Dr. Bryant draft a resolution embodying the sense of the feeling of the meeting for the guidance of the association's delegate who was to be detailed to attend a conference of veterinary surgeons to be held in Ottawa during the month of November. This motion carried, and the meeting then took a recess while the committee drafted the resolution. On reassembly the resolution was presented, and on being put to a vote it was carried.

Dr. J. A. Munn of Carman, who was elected as the Association's representative on the Dominion Advisory Board on Veterinary Education at the last annual meeting, was asked to represent the Association as their delegate and was furnished with the foregoing motion for his guidance. Dr. Munn assured the members that he would comply with the resolution and do everything possible in the best interests of the veterinary association and the profession at large.

On motion of Dr. McEwen, seconded by Dr. Stevenson, the President, Dr. F. W. Bryant was selected as an alternative delegate, in the event of anything arising to prevent Dr. Munn from attending the conference.

J. B. STILL, *Secretary*.

CALIFORNIA STATE BOARD OF EXAMINERS

The State Board of Examiners of California held a meeting in Los Angeles on October 20, at which time a class of eight took the examination, four of whom passed.

The four passing were graduates of the following colleges:

Two from Washington State College, one from Chicago Veterinary College, one from Indiana Veterinary College.

Of those failing one was from McKillip Veterinary College, one from Chicago Veterinary College, one from Kansas City Veterinary College, one from Western Veterinary College.

JOHN L. TYLER, *Secretary*.

CENTRAL MICHIGAN VETERINARY ASSOCIATION

Tuberculin tests in cattle formed the subject of talks by several speakers at the meeting of the Central Michigan Veterinary Medical Association, held at the Jackson City Club on October 14. The meeting was one of the most successful and profitable ever held by the Association. Approximately 50 members were in attendance.

Dr. B. F. Killham, State Veterinarian, spoke on the work of the new State agricultural department, and the methods used in dealing with bovine tuberculosis. Dr. J. A. LaCroix, Chicago, editor of the *North American Veterinarian*, spoke along similar lines, while Dr. C. C. Mix, of Battle Creek, took for his subject the economic value of tuberculin testing.

Dr. C. C. Clement, of Hudson, gave a synopsis of the early days in tuberculin testing, and drew a verbal picture of the remarkable progress which has been made. The speaker was one of the charter members of the Michigan Veterinary Association, which was organized in 1883. The progress of the State Association was outlined by Dr. Rummels, of Lansing. He reported that 48 applications for membership had been received during the past year.

Centralized killing of livestock was advocated as an economic

necessity by Dr. H. H. Sparhawk, of the Detroit Board of Health. He stated that the State metropolis has 100 abattoirs under inspection, and that all meat was inspected and stamped before entering the city. He declared that 2,000 pounds of veal had recently been condemned because the calves had been slaughtered before they were two days old.

That the pronounced increase in hog cholera in the State is due to improper vaccination and use of virus was the opinion expressed by Dr. Newton, of Lansing.

Other speakers were Drs. A. L. Curtis, of Hillsdale; A. Z. Nichols, Pittsford; and R. S. Johnston, bacteriologist of the State Board of Health.

Dr. H. L. Roberts, meat and milk inspector in Jackson, acted as toastmaster at the banquet which followed the discussions.

W. N. ARMSTRONG, *Secretary*.

PHILADELPHIA VETERINARY CLUB

The regular monthly meeting of the Philadelphia Veterinary Club was held on Tuesday evening, October 25, at the Veterinary School, Philadelphia, Pa.

Dr. J. A. Kolmer, Laboratory of Dermatologic Research, University of Pennsylvania, addressed the Laboratory Section on "Some Phases of the Complement Fixation Test."

The regular club meeting was an open meeting. No special subject was on the program. Several of the members reported on cases that they had treated, which called forth interesting discussions, and much valuable information was obtained in general.

We had an exceptionally large attendance.

C. S. ROCKWELL, *Secretary*.

CALIFORNIA STATE VETERINARY MEDICAL ASSOCIATION

The next meeting of the California State Veterinary Medical Association will be held at Davis, California, from January 2 to the 7th, inclusive, 1922. This will be a practitioners' short course held at the College of Agriculture of the University of California and it is expected to be even more successful than any held heretofore.

Particular stress will be laid this year on diseases of cattle. Dr. D. H. Udall of the Cornell Veterinary School will be the principal lecturer on this subject. Other prominent men who will deliver lectures during the Short Course are: Thomas F. Hunt, Dean of the College of Agriculture; Elwood Mead, Professor of Rural Institutions; B. H. Rawl, formerly Assistant Chief of the United States Bureau of Animal Industry; G. H. Hecke, State Commissioner of Agriculture; J. P. Iverson, Chief of the State Bureau of Animal Industry, and others.

JOSEPH M. ARBURUA, *Secretary.*

PENNSYLVANIA STATE VETERINARY MEDICAL ASSOCIATION

The Board of Trustees of the Pennsylvania State Veterinary Medical Association has authorized the announcement that the 1922 meeting will be held in Harrisburg, Penna., Tuesday and Wednesday, January 24th and 25th.

Every effort is being made to have the 1922 meeting as attractive to practitioners as the 1921 meeting proved to be. The assistance of the practitioners of Pennsylvania, who have organized local Veterinary Clubs throughout the State, is being enlisted. At the present time almost every veterinarian in the State belongs to one of the eight clubs now meeting regularly.

Each Veterinary Club has been asked to select one of its members to present a paper of interest to the practitioner and two additional men to open the discussion of the paper. Many of the clubs have notified the Secretary that their men have been selected and keen rivalry for the presentation of the best paper insures an excellent program.

The Pennsylvania State Veterinary Medical Association has, for the past few years, been a member of the Allied Agricultural Associations. All associations of this alliance meet in Harrisburg at the same time each year. Joint sessions are held at least two evenings during the week, and the interest that livestock owners take in the veterinary meeting frequently places standing room at a premium.

The close contact between the veterinarian and the livestock owner, during this Agricultural Week, is a very valuable factor in placing the veterinarian in proper relationship with his client.

Holding the meeting in Harrisburg also has the advantage of bringing the practitioners in close contact with the Pennsylvania Bureau of Animal Industry officials. Livestock owners cannot help but be impressed with the cordial relationship that exists between the practitioners of this State and the Bureau of Animal Industry. This not only strengthens the position of the Bureau, but reflects to the advantage of the practitioner.

Every member is urged to attend the 1922 meeting, and visiting veterinarians are assured of a cordial welcome.

R. M. STALEY, *Secretary*.

WESTERN NEW YORK VETERINARY MEDICAL ASSOCIATION

The Western New York Veterinary Medical Association will hold its seventh annual meeting Thursday, December 15, 1921, 1:30 p. m., at the S. P. C. A. Hall, 121 W. Tupper Street, Buffalo, N. Y. There will be a good clinic before the business meeting. Election of officers for the coming year will be held and a noted veterinarian will address the association in the evening.

F. F. FEHR, *Secretary*.

Postal cards for nominating a member of the Executive Board from district No. 6 were mailed from the Secretary's office on October 18th. Nominating cards were only sent to those members who have paid their dues for the current year.

The fourteenth annual conference for veterinarians will be held at the New York State Veterinary College at Cornell University, Ithaca, N. Y., January 12 and 13, 1922. The program will be of especial interest to practitioners.

The thirty-fourth annual meeting of the Iowa Veterinary Association will be held on January 17, 18 and 19, 1922, at the Hotel Savery, Des Moines, Iowa.

The Pennsylvania State Veterinary Association will meet at Harrisburg, Pa., on January 24 and 25, 1922. R. M. Staley, Philadelphia, Pa., Secretary.

The Northern Tier Veterinary Club will meet on February 9, 1922, at Williamsport, Pa. F. B. Mayer, Canton, Pa., Secretary.

COMMUNICATIONS

THE OCCURRENCE OF FIVE LUMBAR VERTEBRAE IN THE MORGAN HORSE

To the Editor:

In the September issue of this JOURNAL, the Editor asks our veterinary anatomists whether they have any information regarding the occurrence of five lumbar vertebrae in the Morgan horse, a subject lately discussed in the *National Stockman and Farmer*.

I am not a veterinary anatomist in the sense of being a teacher of that branch of our science. But I think this question concerns equally the hippologist, perhaps even more so from its practical aspect in relation to the history of the horse, his external conformation, equitation, horse-breeding, etc. I shall, therefore, gladly contribute to the knowledge asked for by making a few brief statements of observations and facts relative to the subject under dispute.

As an introduction into the question the fact appears as fundamental that the fossil remains of horses show already anatomical variations in the process of the evolution of the horse. A study of such specimens in the Museum of Natural History, here in New York, proves that the earliest three-toed horse has eight lumbar vertebrae; a three-toed specimen of a later period has seven; a still more advanced three-toed horse has but six. The fossil Scotti horse of Texas has six lumbar vertebrae. Of present horses the skeleton of a Percheron has six and a giant cart horse has six, both representing the Forest type of Europe. The Thoroughbred "Sysonby," artistically mounted at running speed, has six lumbar vertebrae, but the transverse processes of the sixth lumbar vertebra are very short on both sides. The Arab stallion Nimr, representing the Desert type of horse, has only five lumbar vertebrae. Of other Equidae the "Wild Ass" (*Equus kiang*) of the high plateaus of Thibet has but five lumbar vertebrae, and while classed among asses is closely allied to the horses. Grant's zebra (*Equus burchelli*) has six lumbar vertebrae, but the sixth vertebra has a much narrower spinous process and much shorter transverse process than the preceding five lumbar vertebrae.

The evidence shown by these specimens in this Museum of

Natural History, which has the most complete, best arranged and most artistically finished collection of equine skeletons in this country or in Europe, is interesting in various directions. It is almost conclusive as to the fact that the Forest type of horse tends to have six fully developed lumbar vertebrae, whereas the Desert type tends to have but five. Personally, I have never seen, heard or read of the occurrence of five lumbar vertebrae in a horse of pronounced draft type, whereas it is not uncommon in horses of the light mixed breeds.

Just as interesting is the apparent fact that the various skeletons strongly indicate the existence of a tendency to eliminate the sixth lumbar vertebrae in breeds used under the saddle. In investigating the course nature takes to perform this task, it is evident that the process starts by first reducing the transverse and spinous processes of the sixth lumbar vertebra to a more or less rudimentary state, followed up by ankylosis with the lumbar processes of the fifth lumbar vertebra, resulting in one misshaped wing of irregular form. I have noticed such specimens every now and then for many years past. In the museum, here in New York, this process is well illustrated in a skeleton of a Shetland pony which shows complete ankylosis of the transverse processes of the sixth and fifth lumbar vertebrae on the left side and a partial confluence on the right side.

That the Thoroughbred frequently has only five lumbar vertebrae is quite well known. Those army veterinarians who visit the Cavalry School at Fort Riley, Kansas, can see there for themselves in the lecture room a skeleton of a Thoroughbred which has only five lumbar vertebrae and a pedigree dating back to Darley Arabian as shown by the school records. There is a legend at that school that Drs. Plummer and Jewell were fishing in the vat a long time for the sixth lumbar vertebra. In many and long rides in the Southwestern prairies and along the Mexican border I have quite often observed five lumbar vertebrae in prairie skeletons of the original Texas broncho (Mexican pony) which as history tells us were of Spanish-North African descent.

From the facts elicited above, it should not be considered extraordinary to find five lumbar vertebrae in some Morgan horses. It is undoubtedly a mixed breed, although Justin Morgan, the founder of the breed, is described as 14 hands high, off an Arab sire and dam, was used in the Revolutionary War as a

charger and later matched for trotting races under saddle, yet he was mated to many mares of unknown ancestry. The cross-breeding of the two original types of the Forest horse with the Desert horse, practised for many hundreds of years past in Europe, has produced numerous mixed breeds, retaining either predominant characteristics of one or the other or blending both. Our own horse population is as heterogeneous as is our human population, a veritable equine melting pot. In this way the evolution of the horse is still going on.

It is another question, however, to conclude forthwith from the occurrence of five lumbar vertebrae that a horse is of pure Arab descent. It does constitute one strong indication in that direction, but one only. Chief among other anatomical differences, the skull of the horse should be examined. The Arab skull is decidedly brachycephalic with high and prominent eye sockets. An equally strong indication is found in the construction of the ulna of the Arab, which, while rudimentary, is still running along the radius, while in the Forest type it is never more than a splint. To finish, the very high sacrum of the Arab and its connection with a pelvis approaching a horizontal, should not be excluded from this search if it is intended to trace the ancestry of a horse by osteological evidence. Our veterinarians can help along our breeders in this respect.

In discussing this question the other day with a breeder of draft horses, he said: "Why in the world do these Morgan people make so much fuss about those five lumbar vertebrae? I cannot see any value or superiority in it, and I don't think they know any more about the bones of the horse than I know." Now, I have been acquainted with many horse breeders, and among them a few breeders of Morgan horses, and found among them several who were sticklers on facts of anatomy, zoology, archaeology and what not. True, most of the practical breeders care little about anatomical variation, etc., but the occurrence of five lumbar vertebrae proves to them their contention that a horse with a *short*, strong loin has the capacity to carry greater weight with less fatigue than a horse with a long back. All experienced riders sustain this contention. It means, therefore, a good advertisement, somewhat mystic but quite fetching.

While this contention of practical horsemen and breeders is perhaps of more or less empiric origin, we ought to help them

by showing that it has also a firm scientific foundation. In the study of statics and mechanics of the skeleton of the horse, physiologists and hippologists have long ago found it helpful to compare the construction of the vertebral column with bridge-work. They explain that the cranial bridge-pillar is formed by the thoracic vertebrae with their ribs, sternum, neck, skull and anterior extremities; while the caudal pillar is made up of sacrum, pelvis and the posterior extremities. The obliquely ascending trusses of a bridge are represented by the spinous processes of the dorsal vertebrae which slant from forward to rear and again slant from rear to forward towards a center-piece. The vertebrae constitute connecting links sustaining principally horizontal pressure, as the pressure (of weight) drives from the middle towards both ends, and the weight is diverted in the living horse from the 14th-16th dorsal vertebrae, forward and backward, being finally transmitted toward the bridge-pillars, *i. e.*, the extremities. Elasticity is largely secured by the convexity of the lumbar curvature. If we look at the profile of a skeleton of a horse, it is easy to follow this explanation. Furthermore, in comparing a skeleton of an Arab having five lumbar vertebrae with that of a draft horse having six, the greatly more compact structure of the former and consequent ability to carry weight is at once apparent. Whether the cause of this variation in structure is due to physiological adaptation of the Arab from centuries of use under saddle as some physiologists maintain; or whether the short, strong loin of the Desert type of horse is original and produced by environment, as zoologists maintain, is an academic question not yet agreed upon by scientists. In fact, there is much more to be seen and to explain in these skeletons if we follow this matter up to an end. This, however, would lead us also into a study of the behavior of the center of gravity, center of motion and other physical phenomena of the living horse not here under discussion, so that it is better to close at this point. To army veterinarians, who are required to deliver instruction in hippology, I recommend the perusal of my article on "The structure and function of the horse's back and their relation to the form and use of the saddle," published in 1910 in the *Journal* of the U. S. Cavalry Association, where all these points are considered in a popular essay.

OLAF SCHWARZKOPF.

HORSES, TRACTORS AND TRUCKS

To the Editor:

Your people have a direct, financial interest in the maintenance of horse use, for it means lower production costs, essential in the readjustment now taking place.

The investigations of the Department of Agriculture and the colleges of agriculture in Illinois and Minnesota, indicate that on farms where tractors have been purchased, the number of horses displaced ranges from one-fifth to one-fourth; but if we were to grant, for the sake of argument, that they might displace one-third of the horses on farms over 100 acres by the purchase of one tractor for each such farm, we would have to buy 2,673,345 tractors, this being the number of farms of that size at the time the 1920 census was taken.

Government figures released July 22, 1921, on the number of tractors manufactured and selling price thereof to wholesalers, retailers and jobbers, show the average selling price by manufacturers to be \$993 each. Adding 25 per cent the customary difference between manufacturer's price and price to farmer, we have an average cost of \$1,241 per tractor; but if we concede lower prices and put the tractors in at \$1,000 apiece, it means that we would have to spend \$2,673,345,000.

Seventy-five per cent of the improved acreage of the United States is in farms of 100 acres or over. It is a fair conclusion that approximately 75 per cent of the horses and mules are to be found on such farms, or 19,194,808 head, and the displacement of one-third of these would mean the displacement of 6,398,269.

The census figures released July 29, 1921, give the total valuation of horses and mules at \$2,562,075,481; 75 per cent of the horses and mules on farms of 100 acres or over, as per above assumption, will give us a valuation of \$1,921,556,610 for all horses and mules on such farms. If we grant, then, that the use of tractors might displace one-third of the horses and mules, it would displace horses and mules valued at only \$640,518,870; and it must not be forgotten that tractors do not last as long as horses.

In other words, such a shift can not possibly be considered an economic one, for it would displace animal motive power units valued at a little over \$640,000,000 with mechanical motive power units costing more than \$2,673,345,000, or more than four times as much.

Tractors last from 3 to 5 years. Horses have an average working life of 12 years on farms, after going into work as 3 year olds, and all the argument, all the selling propaganda that can ever be put over by the tractor and truck manufacturers can never shift such a tremendous economic obstacle as is involved in a change that would require the farmers of this country to spend more than four times as much in original investment for mechanical power units that would not last half as long. BUSINESS INTERESTS OF THIS COUNTRY CAN NEVER BENEFIT BY SUCH A CHANGE, for it will simply mean that farmers will pay eight times as much for their motive power as they are now paying.

The argument of the tractor man that it costs more to feed horses and mules than to buy gas, oil and repairs for a tractor, is not correct. Horses and mules displaced under such a shift can be maintained today for less than the cost of oil, gas and repairs for tractors. Furthermore, no saving in labor is effected; no larger crops raised. (See Bulletin 231, Illinois Experiment Station, for further details on this point.)

What I have said of tractors applies in the same measure to trucks. Road hauling requires on the average, on Corn Belt farms, only 25 to 30 days' work per year with one man and team, most of which comes during the fall and winter when farm horses would otherwise be idle. There is further argument in the comment of Thomas Clark, one of the most successful farm managers in America, who is in charge of Delchester Farms at Edgemont, Pa. He has tried both trucks and tractors. He has discarded them both; tractors for reasons given above; motor trucks because, as he says, "If good judgment is used in arranging the farm work, all road hauling can easily be handled by the teams when they are not needed in the fields."

The automobile is an entirely different question. We recognize that it gives a wide range of travel to families and that it is bought primarily for pleasure purposes. It may be used, and is used to a measure, for business, but the controlling factor in its purchase is, in ninety-nine cases out of a hundred, pleasure. Men do not stop to count the cost of their pleasure; if they did, there would be fewer divorces.

WAYNE, DINSMORE, *Secretary,*
Horse Association of America.

AN EXHIBITION IN MISSISSIPPI

To the Editor:

An interesting exhibit was gotten up by State and Bureau officials for educational purposes at the Mississippi State Fair held at Jackson, Miss., October 17-22. The exhibit consisted of a miniature dipping vat and horn-fly trap constructed by Dr. Flavus Weaver; representation of tick-infested and tick-free cattle; hog cholera control display; pictures of beef and dairy cattle; infected paspalum grass; tuberculosis specimens and equipment necessary in applying the tuberculin test. During the week hundreds of people visited this exhibit and it is believed that a great deal of good has been accomplished along the lines of tuberculosis and tick eradication and hog cholera control. We feel that much credit is due to Dr. Hugh L. Fry, in charge of hog cholera control work in this State, for his assistance in getting up this exhibit.

HUDSON C. CHADWICK,

Executive Livestock Inspector.

GERMAN SAVANTS ON TUBERCULOSIS

At the recent German tuberculosis congress, held at Bad Elster, the question of immunity was discussed by Prof. Isaac von Wassermann and by Dr. Neufeld, rector of the Robert Koch Institute. Both announced, as reported in the *London Times*, that they have come to the conclusion that there is no immunity against tuberculosis in the sense in which it is understood in regard to smallpox, measles and some other infectious complaints. They stated that in their conclusions "we must entirely abandon the hope of protection or precaution against tuberculosis by tuberculin or by injecting tuberculosis bacilli. In all cases of immunity, such as diphtheria and smallpox, we have only done what nature does. Against these nature created prophylactics, but did not do so in the case of tuberculosis. Therefore it is no good searching for new tuberculin. On the other hand, we might very well hope that some chemical substance would be discovered that would attack the tuberculosis bacilli."

According to the report of the German imperial slaughterhouses and meat-inspection offices, during the second quarter of 1919 the meat of 3,642 dogs was subjected to inspection, 2,301 in Saxony alone.

NECROLOGY

The community of New Rockford, N. D., is mourning the death of one of its most beloved and well-known citizens in the passing away of Dr. Charles H. Babcock, death following a week's illness from appendicitis. When he became ill he was immediately taken to the hospital, but it was found that his condition was such that an operation was impossible.

Charles Henry Babcock was born on October 16, 1865, his funeral taking place on the anniversary of his fifty-sixth birthday. He went to New Rockford in 1902 and for several years was a member of the drug firm of Babcock & Bucklin, later taking a course in veterinary medicine, which profession he has followed since. He was appointed as a member of the State Veterinary Medical Examiners' Board by Governor Burke, and has held that position ever since by appointment of Governor Hanna and Governor Frazier. He had been secretary of the board for several years past, and was also a member of the A. V. M. A. He found time to devote much work to the civic bodies of New Rockford. He had been a member of the Board of Education of that city for several years, and this year was acting as its president and had also served on several other civic improvement bodies.

A charter member of Zion Commandery, Knights Templar, he served as its eminent commander for several years; he was also a past master of Century Lodge, No. 60, A. F. & A. M.; past worthy patron of the Eastern Star and a past master workman of Century Lodge, No. 60, A. F. & A. M. To these positions he brought the thorough, conscientious work characteristic of him, and his influence, advice and good judgment have always been for the best interest of the organization of public bodies on which he has served. He was a member of Carrington Chapter, Royal Arch Masons, and of El Zagal Temple, Nobles of the Mystic Shrine.

During his work for the State board he had been in practically every community in the State, and in each had made those with whom he came in contact his warm friends by his exceptional manner, his conscientiousness and his unselfish regard for the welfare of others. He was a man among men; a helper to the unfortunate in time of need; a wise counselor and a true friend.

Dr. S. W. White, aged 81, for 30 years a veterinary practitioner at Charlottesville, Va., died at the home of his daughter, Mrs. L. H. Snow. He had been an invalid since last January. Dr. White was a native of Kilbourn, Ohio, where he married Mrs. Margaret Cummings, who died 19 years ago. He went to Virginia in 1879, locating at Kents Store, Fluvanna County. Besides his daughter, he is survived by three stepchildren.

The inventor of the pneumatic tire, G. B. Dunlop, who died recently in Dublin, Ireland, at the age of eighty-five, was a veterinarian. He was a native of Scotland. It is said that he conceived the idea of the pneumatic tire while making a tricycle for his little boy.

The cattle industry of Paraguay is passing through a serious crisis as a result of the suspension of operations by the American meat-packing plants. The ranch owners feel that the only way to relieve the situation is to export their cattle to Argentina. However, as the Argentine cattle market is also passing through a similar crisis, the prospects for relief of the situation are not bright.—*Wichita Daily Stockman*.

Hog cholera is becoming quite prevalent throughout the State. In many counties losses due to this disease have run as high as \$10,000 in the last month.—*Iowa Farmer*.

The Missouri legislature has enacted a law requiring that after January 1 next, any herd of cattle containing 5 or more cows must be tuberculin tested and found free from the disease before milk can be sold from the herd. The test will be made by State or Federal officials free of charge to herd owners.—*Wallaces' Farmer*.

An English veterinarian reports to *The Veterinary Record* an unusual case of foreign bodies in a bull's rumen. The animal was "not doing well" and was slaughtered. In the rumen were found two large iron wedges used for splitting wood and a collection of iron bolts, nuts and screws numbering over a hundred. The owner had been making some repairs to his house and premises, and a barn to which the bull had access had been used as a workshop.

MISCELLANEOUS

DR. DUNCAN McEACHRAN AN HONORED GUEST

On October 13 there assembled a gathering of veterinarians in the vice-regal suite of the Ritz Carleton Hotel in Montreal to tender possibly the highest tribute that has ever been paid to a living veterinarian. This gathering during the centenary exercises, celebrating the founding of McGill University in Montreal, was a complimentary dinner given to Dr. Duncan McEachran by the graduates of the old Montreal Veterinary College, which was later adopted by McGill University as its Faculty of Comparative Medicine and Veterinary Science. The school was established in 1866 and was the third on the North American Continent, yet the first to adopt and maintain a three-year course. It was discontinued in 1903, as Dr. McEachran found it impossible to continue its operation at such a great personal sacrifice, no provision having been made by the university for its financial support and the Province of Quebec contributed but a very small sum for its maintenance.

Sixty of the three hundred and twelve graduates assembled from widely separated points as an expression of their homage to one of the pioneers of veterinary education on the North American Continent, who has the distinction of establishing, through his high ideals, the first veterinary school to maintain a three-year course. From the most remote points were: Drs. Lamb, of Denver; Darling, of St. Louis; Fahey, of Waycross, Ga.; Tamblyn, of Calgary, and Townsend, from New Glasgow, Nova Scotia. These, with others from less distant points, joined to do homage to an octogenarian and renew old associations.

The chairman for the occasion was Dr. Fred. Torrance, Veterinary Director General for the Dominion of Canada.

The chief tribute of the guests was presented by Professor V. A. Moore, Dean of the New York State Veterinary College at Cornell University; although not a graduate of the school, he has been associated with Dr. McEachran in many investigations of a scientific character, as well as a warm personal friend. This masterly address was ably seconded by Dr. W.

Reid Blair, a graduate of McGill, who is presently engaged as a scientific expert on the maintenance of wild animals in captivity by the Zoological Gardens, New York.

Dr. Moore gave a scholarly address, concerning himself with the important functions of his profession in order to more fully convey to Dr. McEachran the deep sense of appreciation with which he is regarded by the members of his calling. He reviewed the history of the institutions over which Dr. McEachran had presided, saying there could be no compliment more expressive of the high esteem with which the doctor is held than such a gathering of distinguished men from many States and provinces. Likewise there could be no testimonial more acceptable than to be assured that his labors were appreciated and that his graduates have played a worthy part in the development of the veterinary profession of America.

Dr. Blair, in tendering his appreciation, spoke of Dr. McEachran's ungrudging eagerness to be helpful. He had never looked upon the classroom as a task, but as an opportunity of imparting his own zeal and store of knowledge. Dr. Blair spoke of the economic value of veterinary science and its benefit to mankind, and said that the field of veterinary medicine was not one of commercial exploitation, but one of service.

Dr. McEachran was given a rousing welcome as he rose in reply to the toast. In expressing his pleasure at the invitation to attend the dinner, he remarked that the Macs are all clannish, and it would not have surprised him a bit if in that gathering of the Sons of Old McGill someone had got up and asked them to drink that old but extremely modest toast,

“Here's to oor ain sel's—wha's like us?”

The speaker referred to a gathering in Boston on January 19, 1896, when the Massachusetts Alumni of the Department of Comparative Medicine of McGill University met at the Quiney House, and the reporter of the Boston *Globe* of the following day referred to them as “All healthy, hearty-looking men.” In reminiscent mood, he recalled that the reporter had referred to the ease and dignity with which he carried his years. “Why, I was a young fellow then and I am not an old fellow now,” a sally greeted by a roar of applause.

Proceeding, Dr. McEachran said: "Institutions of learning may be built, equipped and endowed by the large-hearted liberality of benefactors, yet if their graduates forget their duties to Alma Mater enduring progress cannot be made. I am not going to presume to lecture in this after-dinner speech on these duties, yet one cannot help taking advantage of such an opportunity of speaking to such a representative gathering as this, to say a few words on this subject. Graduates should feel that they are a part of the university, that they ought to continue to take an active interest in her affairs and have their views on all important matters expressed by their representatives. Each individual graduate should ever keep before him the feeling that his professional standing, his research work and contributions to science reflect credit on his college."

The prefix "Old" is in one sense at least no longer applicable, said the speaker, referring to the noble pile of new buildings. He hoped that the day is not far distant when the Faculty of Comparative Medicine will be restored and endowed in a manner proportionate to its importance scientifically and practically. "I cannot refrain from remarking," he said, "that one of the greatest blunders ever committed in the management of McGill University was allowing that faculty to close its doors for want of necessary financial support."

After reviewing the incidents of the past year, Dr. McEachran closed by saying: "Let me conclude by thanking you for this crowning compliment of my life, for which I cannot find language to adequately express my feelings of appreciation."

The next toast of "The Veterinary Profession" was proposed by the chairman and responded to by Dr. Chas. H. Higgins, of the Lederle Antitoxin Laboratories of New York, and Dr. C. D. McGilvray, Director of the Ontario Veterinary College.

Dr. Higgins took the place of Dr. W. L. Williams, professor of surgery in Cornell University, who was unavoidably absent through illness. The theme running through his remarks was, that we must all so perfect ourselves in our chosen calling that we can render that service to humanity for which our train-

ing best fits us. This is the idealism instilled by Dr. McEachran throughout the entire college course, and it is one which has made it possible for the men from McGill to excel in their respective communities.

Dr. McGilvray paid a very high tribute to Dr. McEachran and the work which he had accomplished in Canada, when the knowledge of disease of animals was just becoming to be an important factor in world commerce and at a time which required a great deal of force to have one's convictions carried into action. He also referred to the task which now confronted him in educating the youth coming as students, in the new teachings, and in this the changed conditions which necessitated the removal of the school over which he presided from city to country surroundings, for the purpose of securing adequate clinical material for a continuance of the practical teaching which is so necessary.

The toast of "The Graduates" was proposed by Dr. M. C. Baker, of Montreal, the oldest professor of the school. Dr. Baker referred very feelingly to the part which Dr. McEachran had played in his guidance. An association of forty years in active business partnership had presented traits of character that a shorter and less intimate association would never have revealed. During this time there had never been any but the very best of feeling between them and at no time had there been a serious difference of opinion to mar the smoothness of their relationships. Dr. Baker, next to McEachran was father to us all, as it was he who guided the trembling footsteps of those being initiated into the mysteries of Comparative Anatomy. Dr. Lamb, of Denver, Colo., replied in his usual scholarly manner and with a great deal of force. He pointed with pride to the standing of the school and was particularly gratified at the return of so many to do honor to our worthy preceptor and Dean.

Dr. Robinson, of Washington, gave many reminiscences of the older days and some of the struggles necessitated by the changes that have taken place in the teaching of comparative medicine during the past decade.

A guest representing the only school in the Province of Quebec and the only school of comparative medicine in which the teaching is conducted in the French language on this

continent was Dr Daubigny, Dean of Ecole Vétérinaire of Laval University, who gave in his native language a very high tribute to Dr. McEachran. He cited him as a pioneer, not only in the province, but in Canada and on the whole American Continent.

It was late when the gathering dispersed, and all were unanimous that the sacrifice was worthy of the opportunity to pay a tribute to such an outstanding personality and professional man as Dr. Duncan McEachran.

CHAS. H. HIGGINS.

AN ENDURANCE TEST FOR HORSES

The third 300-mile endurance contest, conducted under the supervision of a board of sponsors representing several organizations interested in the development of the best type of cavalry horse, was finished October 14 at the foot of the Washington Monument, in the District of Columbia. Of 17 horses starting in the race 5 days before at Camp Alfred Vail, N. J., only 6 were able to finish. In judging the horses, time counted 40 per cent and the condition of the horse 60 per cent.

The winner of the race was the purebred Arab, Crabbet, owned by W. R. Brown, of Berlin, N. H., president of the American Arab Horse Association. Crabbet is 11 years old and weighs 925 pounds. He won with a total score on condition and speed of 84 7/45. Vagrant, a Thoroughbred entered by the U. S. Army Remount Service, 6 years old, and weighing 1,000 pounds, was placed second with a score of 83 7/9. Rustem Bey, a 10-year-old Arab-Standardbred cross, weighing 1,005 pounds, was third, scoring 75 8/9.

Castor, a purebred Morgan, entered by the U. S. Morgan Horse Farm, Middlebury, Vt., won fourth place with a score of 72 2/9. This horse weighed only 800 pounds, and is 11 years old. He carried 245 pounds, the standard load for all the contestants, which was nearly one-third of his weight. This is the third successive year he has finished the endurance test. He has been used for all sorts of work, including farm work, mount for a forest ranger and helping to draw the carriage of the Secretary of Agriculture in Washington. Fifth place was taken by Pathfinder, a Thoroughbred owned by the Remount Service, with a score of 62 2/3. He is 5 years old, the youngest of the

entries, and weighs 910 pounds. Cragmore, a Thoroughbred-Standardbred cross, owned by W. R. Brown, the owner of Crabbet and Rustem Bey, took sixth place with a rating of 61 7/45. He is a 7-year-old, weighing 1,100 pounds.

The judges who made the decisions in the contest were Maj. Henry Leonard, Colorado Springs, Colo.; Harry McNair, Chicago; and Garner West, Garnersville, N. Y. The prizes were put up by W. R. Brown, of Berlin, N. H., and Albert W. Harris, of Chicago. The first prize was \$600 and a silver loving cup. The other prizes ranged from \$400 to \$100.

In presenting the loving cup to the winning horse's owner, who was largely responsible for inaugurating the endurance contest, Secretary of War Weeks said: "What you are doing to develop horses of speed and endurance is not only a benefit to the Army but should be useful to the country as a whole in other ways."

This endurance test was the most severe since the race was inaugurated, as the journey was over roads that could scarcely be called ideal for the purpose. In most cases of those that fell by the wayside the direct cause was inflammation of the tendons, as any sign of lameness was a signal for withdrawal.

If the test results in the stimulation of interest in good saddle horses possessed of stamina and hardiness and with the necessary quality to render them desirable for the mounted service of the Army, and if it should help to determine what breed or blood will produce a mount which will satisfy the many exacting demands on a charger, the sponsors for the race will feel amply repaid.

A MOUNTAIN TRIP

Following the A. V. M. A. meeting at Denver, Mrs. Mayo and I took a delightful, but altogether too short, vacation in Estes Park. It had been many years since we had enjoyed a real outing in the Rockies, and we felt as if we had shed several years when we got into the "hills" again.

We left Denver in one of the fine busses of the Rocky Mountain Transportation Company, and were particularly fortunate to have two good sports, Dr. and Mrs. Marsteller of Texas, for company. Mrs. Marsteller was puzzled why some other passenger guessed she was from the South, and inquired in her de-

lightful southern accent, "how you all guessed that?" Going up the Big Thompson the wind whisked Dr. Marsteller's cap away and dropped it on a rock in the edge of the river, and he made no embarrassing remarks but got it back all right.

The weather in the mountains was delightful and the scenery magnificent. The aspens were turning to orange and gold on the mountainsides, amid the dark green of the pine and spruce. We took a number of delightful trips in the park before Dr. and Mrs. Marsteller had to return.

After a few days we took the "circle trip" over the divide to Grand Lake. On our way down the western slope to "Squeaky Bob's" ranch we saw two mountain ewes, each with a lamb two-thirds grown. The driver gave a whoop and they went bounding away down the ravine as if on springs.

At Grand Lake we took a motor boat trip around the lake with several college boys who had been driving sight-seeing busses for the transportation company during the tourist season. These boys began asking the motor boat driver some of the questions they had been accumulating during the season. "Oh, driver, I want the top up." "Oh, driver, don't get too near the edge." "Oh, driver, how many people have been killed here?" "Oh, driver, how wide is 'timber line'?" etc.

Grand Lake is a gem set high in the mountains. From its mirror surface the green and gold of the mountainsides were reflected with the deep blue of the clear skies, a scene one will long remember. From the hotel at Grand Lake one could see the mountains about Leadville, one hundred miles to the south, and from the mountain above the hotel, the Medicine Bow range in Wyoming was visible.

The lodge at Grand Lake has sleeping cabins for its guests. We wondered at the big pile of blankets when we went to bed, but we knew their use before morning, for there was a heavy frost and I didn't dawdle getting my clothes on in the morning and making a 100-yard dash for the big open fire in the dining room, and buckwheat cakes and bacon. They make an entirely different and much better kind up in the mountains.

From Grand Lake we came back over Berthoud Pass and down Clear Creek Canyon to Denver, and then back to the city we call home, with its dirt and smoke that does not shut out the fresh air, bright skies and glorious scenery of Colorado.

N. S. MAYO.

TUBERCULIN TEST BY THE AREA PLAN

The "area plan" of eradicating tuberculosis of livestock is now well established in many States. By this plan an area of considerable size, generally a county, is freed from tuberculosis by the systematic testing of all cattle and the removal of reactors. It has been accepted by the livestock owners, as they evidently believe the plan is a practicable one. The work can be conducted in a much shorter time and at less expense than the accredited-herd work. Then, too, it means the suppression of the disease among all the herds in a given area, in contrast with accrediting herds here and there which may be in close proximity to infected herds on adjacent farms.

As a demonstration of the feasibility of tuberculin testing of all the herds within a county, no better example can be given than the work done in Wahkiakum County, Wash., during July and August, 1921. The work started in that county August 3 and was completed September 9. Every herd in the county with the exception of two was tested by Dr. L. V. Hardy.

One of the two herds not tested consisted of only two animals. This owner desired to have a test applied but was unable to catch the animals, which were running in a large pasture and were very wild. The other owner refused to submit to the test until just as the inspector was leaving the county, when he sent word that he desired that the test be applied.

The work was carried on principally in cooperation with the farm bureau members. They furnished conveyance whenever there was a member who owned an automobile. The county appropriated funds to pay operating expenses of the automobiles, and also to hire conveyances when necessary. Farm bureau members cooperated so well that not a single day's time was lost on account of transportation. When it is considered that the work was done without any compulsory laws or regulations, and was wholly a voluntary proceeding, it is felt that the county test was extraordinarily complete.

The actual number of herds tested was 367, comprising 4,039 cattle. The test revealed 58 tuberculous animals which were confined to 12 herds, making the total of $3\frac{1}{2}$ per cent of infected herds and $1\frac{1}{2}$ per cent of infected cattle. Post mortem examination of the 58 reactors revealed 100 per cent lesions of the disease. The actual test was completed at an expense of a little

less than 18 cents per head, including \$100 appropriated by the county and a pro rata share of the overhead expense of the bureau office in the State of Washington. It is planned to have an inspector return to Wahkiakum County about November 15 to retest herds that were found infected, and, if possible, to test the two remaining herds.

TREATMENT FOR TAPEWORMS IN DOGS

Dogs are the primary hosts for a number of species of cestodes among the more important of which may be mentioned:

Taenia pisiformis (*T. serrata*), the intermediate stage of which is the *Cysticercus pisiformis* found in the rabbit. *Taenia hydatigena* (*T. marginata*), the intermediate stage of which is the *Cysticercus tenuicollis* found in sheep, cattle and hogs. *Dipylidium caninum* (*T. cucumerina*), the intermediate stage of which is known as a *Cryptocystis* and is found in the dog-flea and louse. *Multiceps multiceps* (*T. coenurus*), the intermediate stage of which is the *M. multiceps* (*Coenurus cerebralis*), found in the brain of sheep. *Echinococcus granulosus* (*T. echinococcus*), the intermediate stage of which is *E. granulosus* found in sheep, hogs, cattle, other animals and man. *Taenia ovis*, the intermediate stage of which is *Cysticercus ovis* found in sheep.

The presence of tapeworms is ascertained by a microscopic examination of the feces for the presence of eggs, by giving enemas for dislodging segments and by seeing the segments pass in the feces. The segments of *Echinococcus granulosus* are not readily seen in the feces on account of their small size. This parasite is the most important one from a public health aspect on account of the fact that the eggs when ingested by man develop into the intermediate stage in the human body. The development of the large *E. granulosus* cysts in human beings frequently results in the death of the infected individual. Fortunately, it is extremely rare in this section of the country and I do not remember ever having seen this variety of tapeworm in the dog.

Many drugs have been recommended in the treatment of animals infested with these parasites, but none act so quickly and seem to possess such a specific action against them in the dog as arecoline hydrobromide. The drug is given by the mouth in tablet form on an empty stomach. One-fourth of a grain may be given to medium-sized dogs, and one-eighth of a grain to the small

breeds. It acts on the bowels in from 20 minutes to one-half hour and the parasites are passed with the feces. A single treatment seems to remove all the parasites including the heads. In one case 168 complete tapeworms were passed following a single administration of one-fourth grain of the drug. It is of advantage to follow the arecoline treatment after the worms have been passed with 10 to 15 drops of camphorated tincture of opium (paregoric) in a dram of essence of pepsin to quiet down the excessive peristaltic action caused by the arecoline.—WILLIAM J. LENTZ in *University of Pennsylvania Bulletin, Veterinary Extension Quarterly, No. 3, page 2.*

PAY YOUR DUES

If your JOURNAL stops, it is quite likely that your dues for the current year have not been paid to the Secretary of the A. V. M. A. Therefore, before writing to the Editor making complaint or asking why the JOURNAL failed to reach you, it might be well to make sure that your dues are paid up to date. If they are not paid, notice has been mailed to you by the Secretary calling attention to this fact. One of the requirements of the Post Office Department is that all papers and publications may be sent only to those fully paid up, therefore when a member fails to respond to calls from the Secretary the Editor is notified to remove that member's name from the list as delinquent in payment of dues. A certain share of the dues paid by each member is sent to the JOURNAL, and if the members do not keep their dues paid up it simply means that others must carry the burden of financing the paper and the Association.

Dr. A. C. Knapp, one of the alumni of the New York State Veterinary College at New York City, Bridgeport, Connecticut, has been seriously ill. In a letter from Mrs. Josephine L. Knapp, she states he has been suffering from gastric ulcer and became so weakened from hemorrhages that the doctors were obliged to make a blood transfusion. He is now greatly improved but will have to remain in bed for some time to come. Dr. Knapp has been connected with the Bridgeport Board of Health for the past fifteen years.

SCHOOL CHILDREN IN TEST ON CATTLE TICK

With 30 questions to answer in 20 minutes, ten children from the Jackson, La., school, waded into the written examination on "The Cattle Tick Fever," and showed State Superintendent T. H. Harris and the whole teachers' institute just how few terrors the ordeal had for them. Nearly every one of the ten scored above 90 and not one of them was far below the mark.

Dr. W. L. Coplin and Dr. L. D. Nowell, of Humboldt, Tenn., have formed a joint partnership and are conducting two veterinary Hospitals.

Dr. Coplin is stationed at Jackson, Tenn., and Dr. Nowell at Humboldt.

They both report practice conditions favorable.

Dr. John A. Phillips, who has been connected with the city health department of Birmingham, Ala., for some time, has tendered his resignation and will leave for Houston, Texas. Dr. Phillips has accepted a place with the Houston Clinical Laboratory.

Dr. John P. O'Connor, formerly engaged in practice in Oklahoma, has been reinstated in the U. S. Bureau of Animal Industry service and assigned to hog cholera control work in Tennessee. His headquarters are at Nashville.

Dr. R. E. Shigley, of Kenmore, N. D., President of the State Board of Veterinary Medical Examiners, spent several days recently at New Rockford, N. D., in attending the funeral of Dr. C. H. Babcock.

Dr. Alfred Savage, who was connected with the MacDonald College of Quebec, has accepted the position as professor of animal pathology of the Manitoba Agricultural College, Winnipeg, Manitoba.

Dr. W. D. Mason, Cincinnati Veterinary College, 1914, has located for practice at Winchester, Franklin County, Tenn.

Dr. J. I. Siress, Terre Haute Veterinary College, 1912, has located for practice at Chattanooga, Tenn.

JOURNAL

OF THE

American Veterinary Medical Association

FORMERLY AMERICAN VETERINARY REVIEW

(Original Official Organ U. S. Vet. Med. Ass'n.)

J. R. MOHLER, Editor, Washington, D. C.

A. T. KINSLEY, President, Kansas City, Mo. N. S. MAYO, Secretary, Chicago, Ill.
M. JACOB, Treasurer, Knoxville, Tenn.

Executive Board

GEO. HILTON, 1st District; T. E. MUNCE, 2nd District; S. E. BENNETT, 3rd District;
J. A. KIERNAN, 4th District; C. E. COTTON, 5th District; R. A.
ARCHIBALD, 6th District; CASSIUS WAY, Member at Large

Sub-Committee on Journal

S. E. BENNETT J. A. KIERNAN

The American Veterinary Medical Association is not responsible for views or statements published in the JOURNAL, outside of its own authorized actions.

Reprints should be ordered in advance. Prices will be sent upon application.

VOL. LX, N. S. VOL. 13

JANUARY, 1922

No. 4

THE OLD YEAR AND THE NEW

THE YEAR just closed leaves as a legacy more of promise than of actual realization. The recovery from the post-war depression is slow, very slow. It has taken a long time to "turn the corner." In fact, the turn in the road has been a wide bend with a scarcely perceptible curve, rather than a corner. But the turn has unmistakably come at last, and for this we have reason to be thankful.

Conditions are clearly better in every respect than they were a year ago. Agriculture, upon which the prosperity of the veterinary profession depends, finds itself in a much more fortunate situation than for some time past. World affairs are in a fair way to be adjusted and put upon a better basis for recovery and commercial revival. There is a better feeling in the air. The prognosis is undoubtedly favorable.

The treatment required is less heat and more light; less gloom and more sunshine; less circumvention and more courage; less prattle and more patriotism.

In extending to all its readers the greetings of the holiday season and best wishes for happiness and prosperity in the New Year, THE JOURNAL feels that these wishes have a real prospect of fulfilment.

OPPORTUNITIES FOR VETERINARIANS

SUCCESS in veterinary practice depends not only on professional skill but also on many personal qualities and a liberal amount of general knowledge. To a large extent the welfare of the nation's ten-billion-dollar livestock industry depends on keeping our domestic stock healthy and in good condition for breeding or for marketing. Frequently the veterinarian stands between profit and loss on a livestock owner's books. Less often but on important occasions, the skill of the veterinarian—like that of a fireman—may check a destructive outbreak which threatens a community.

Such responsibilities call for a high degree of judgment, competence, and manhood. The technical training can be obtained in the many excellent colleges which give veterinary instruction, but the other qualities are developed most fully by individual resourcefulness. The various veterinary services of the Government desire veterinarians to understand fully the different lines of official work, including the importance, method, and organization of such work. Veterinary practice, in most cases, is a local field. On the other hand, problems affecting the health and welfare of the various classes of livestock are matters of national and, frequently, international importance. We wish all veterinarians would look at it in that light. We hope also that everyone engaged in the veterinary profession will consider his field as including more than technical practice. Successful veterinarians recognize that a general knowledge of feeding, breeding, housing, and care of livestock puts them in a position to win the confidence of the owner. A veterinarian who is abreast of the times in those things necessarily radiates his ability of dealing in a competent manner with the problems coming more directly within the scope of veterinary practice.

Briefly the veterinary profession is an important, a useful, and a necessary part of the present great and the future greater livestock industry. It needs men who are well trained, open minded, and of broad interests and sympathies. It is sometimes claimed that livestock receive greater attention than human beings. If such is the case, the human race should receive more expert study rather than livestock any less. The reason is plain. Through many centuries the welfare of nations has depended in a large degree on the food, clothing, labor, and count-

less by-products which livestock have furnished. The person therefore who aids in improving, enlarging, and safeguarding the domestic animals of a nation is spending his life usefully and well.

THE VETERINARY JOURNAL

IT is a pity that, generally speaking, each nation is inclined to consider its own discoveries and progress sufficient for its every day needs, and yet, as far as science is concerned, such an attitude is indefensible. We are prompted to make this remark by the receipt and perusal of a recent copy of the *Veterinary Journal*. Here we have a periodical representative of the British veterinary profession, containing the results of their research, the expression of their views on matters of universal interest, clinical notes, etc.; in short, an epitome of all that is occurring in the progress of British veterinary science. But how many of us could say that they ever read the *Veterinary Journal*, or at any rate see it regularly? Few of us could make such a claim. In other words, we admit that we live in a water-tight compartment and are content to do so. This is not wise; it is hardly polite even and certainly not politic to continue living in happy ignorance of our fellow-workers across the sea. At any rate, it is certainly a state of affairs which is up to each individual veterinarian to remedy.

ADDITIONAL FUNDS FOR TUBERCULOSIS WORK

PRESIDENT HARDING on December 15, 1921, signed the General Deficiency Bill which included an emergency item of \$600,000 as a supplemental indemnity fund for tuberculosis work. Restrictions are carried in the item so that none of the money can be spent on cattle which have not been in the possession of their owners for at least six months, and further, the money can not be used in paying for reacting cattle in herds which heretofore have not been placed under supervision, unless such herds are in so-called circumscribed areas from which the co-operative authorities propose to eradicate tuberculosis from all the cattle therein, under the accredited area plan of operation. The recommendation of the Secretary of Agriculture was for an indemnity appropriation of \$900,000, so it can be easily calculated that the amount carried in the recent bill will go only two-thirds of the distance the original amount was intended to cover.

IMPORTANCE OF PREVENTIVE MEASURES IN RE-PRESSING ANIMAL DISEASES ¹

By T. E. MUNCE

State Veterinarian, Harrisburg, Pa.

THIS PAPER is a contribution from the Bureau of Animal Industry, Pennsylvania Department of Agriculture, for which the writer is merely the mouthpiece, and in the beginning desires to express his appreciation to our field, laboratory and office forces, also to our cooperating veterinarians and breeders who have been consulted and have offered suggestions. It deals with disease prevention, and therefore with health, which is a condition of physical soundness or well-being.

Health requires a study of hygiene, the aim of which is to render growth nearer perfect, decay less rapid, life more vigorous and death more remote. Hygiene embraces acquaintance with such subjects as physics, engineering, architecture, chemistry, epidemiology, bacteriology, parasitology, statistics, conditions of food, water, shelter and surroundings, the climate, nature of the soil and a knowledge of practicable methods that may be used in preventing disease. Each phase of these subjects that may have any bearing upon the health of animals and man must be considered, and thus it involves our subject, "Disease Prevention," for these things which tend to preserve health will prevent disease.

Much has been written about and considerable done in disease prevention—so much, in fact, that it is lost in volumes of literature available to those who have time to peruse its pages. "To see clearly what has been done, and why, is to see, at least vaguely, what will be done, and when."

We have nothing new or unusual to offer. Our purpose is to stimulate a deeper, keener interest than now prevails, and to point out the possibilities to the many individuals who are in position to give advice on prevention, which is the key to the control of each and every transmissible disease.

Measures for disease prevention were practiced before the time of Christ, even before the causes had been discovered and before the diseases we know today had been designated under

¹ Presented at the fifty-eighth annual meeting of the American Veterinary Medical Association, Denver, Colo., September 5-9, 1921.

their present names. Since times before Christ disease prevention has been a progressive science. During the present age it is terribly neglected.

Biological products, intended to prevent, are supplanting actual prevention. Veterinarians and stockmen are too eager to have a biological product for use in this or that disease and are inclined to say, "We did all that could be done; the biologic is at fault." Many biological products have their places and should not be belittled. We need their assistance as diagnostic and preventive agents. Some of them have no value and it is unfortunate that they are used. All vaccines are the same to many stockmen; and thus, when improperly advised by his veterinarian to use them, it is not the stockman nor the vaccine that is at fault. The veterinarian must assume full responsibility for having given such improper advice.

The prevention of the appearance and spread of transmissible diseases is within the grasp of the owner of livestock, and it is through his ingenuity in the employment of the necessary agencies that the results for which he hopes can be attained. When that is universally realized, greater strides than ever before known will have been made. The owner who devotes his efforts to preventing disease will use less in fighting it, and greater will be the outcome of his livestock industry and larger his income. All classes of owners employ veterinarians, but it is he who employs a veterinarian as one of his agencies in the prevention of disease that becomes the most satisfactory client and receives the largest return for money expended.

One prominent State official has said that the most important factors in dealing with a disease are the central office and the field personnel. We believe the greatest factor in the prevention and control of all animal diseases is the attitude of the livestock owners and the consuming public. If producers and consumers of animal products are not favorable to the repression of animal diseases, our work is hopelessly handicapped. On the other hand, if they recognize the economic feature, and the danger to public health caused by prevalent preventable animal diseases, and unite in an effort to suppress such diseases, there is only one power that may stop an early and complete consummation of the task that we, as regulatory officials, are attempting. We repeat, the producer and the consumer are the greatest factors

in this work. Hence it is our immediate duty to arouse these factors to action. Agricultural editors recognize this truth. In this connection we quote, in part, from farm paper editorials:

Breeders' Gazette: "Malnutrition and disease are the chief causes of inefficiency in farm animals. Contaminated water, insanitary buildings, poor pastures and inferior grades of feed are the enemies of thrift, health and usefulness in stock. Breeding for efficiency is futile if it is not supplemented by feeding, watering and managing for efficiency."

A. J. Glover, Editor of *Hoard's Dairyman*, at the meeting of the United States Live Stock Sanitary Association a year ago, said: "We are trending too much in this Association to veterinary subjects, and not enough to sanitary subjects and subjects that have to do with keeping animals healthy and physically strong."

E. S. Bayard in an editorial in the *National Stockman and Farmer* said that "while it is impossible to overestimate the value of the work of the veterinary profession in preventing, controlling and eradicating diseases of domestic animals, eradication and control have been given most attention. But it is time to consider seriously whether prevention may not be possible to a greater extent than we have supposed. It will be cheaper to keep disease out of territories now free than to put it out later. The American Veterinary Medical Association and the United States Live Stock Sanitary Association at their next annual meetings in September and December, respectively, should consider this problem along with others relating to prevention and should appoint men to confer with dairymen and the various organizations interested in livestock."

Assistant Surgeon General W. T. Sedgwick of the United States Public Health Service published in the *Medical Record* a recommendation that the present curriculums of the medical schools be evenly divided and that one division be devoted to preventive medicine, giving a degree of Doctor of Health, this branch to include those studies relating to sanitary science, vital statistics, laboratory methods, municipal sanitation, preventive hygiene and correlated subjects. General Sedgwick clearly shows the necessity for such specially trained personnel in the health services of the various States and the nation, and the difficulties experienced by these governmental departments in securing the services of persons especially fitted for the work of disease pre-

vention. Our veterinary schools may be profited by giving thought to the General's suggestion.

The general principles of disease prevention can be applied to all classes of diseases. It is possible to prevent disease without knowing the cause; but to prevent disease intelligently and successfully, one must have knowledge of the nature of the disease, its causes and the nature of its cause, its modes of transmission and dissemination, its symptomatology and epidemiology, postmortem lesions, and animals that are susceptible.

In considering the nature of diseases, some are acute and epizootic, while others are chronic and spread over the entire year; others are more likely to occur during one season than another; some are dependent upon an intermediate host for transmission (Texas fever). Such diseases as tuberculosis, bovine infectious abortion (cows calving during every season of the year), actinomycosis and glanders are spread over the entire year; infected and susceptible animals are always present and repression is more difficult.

To understand the nature of the cause of a disease is to understand the best methods of preventing its spread. Knowing that certain spore-forming organisms, such as those causing anthrax, blackleg and malignant edema, tetanus and botulism, exist in the soil, the nature and location of the soil must be taken into consideration. Some organisms are capable of forming a wax, as the tubercle bacillus. Others form capsules. Having knowledge of these phenomena of transmissible diseases, one is in a better position to devise effective methods for destruction. It naturally follows that some organisms are less resistant to drying and exposure to sunlight than others; some require vigorous disinfection and fumigation to make sure of their destruction.

Having made a study of the nature of disease-producing organisms, and knowing the periods of incubation, it has been made more easily possible to formulate the proper quarantine regulations. More than one of our good stockmen have said that the greatest weakness in our accredited-herd plan is the short time that additions to herds are required to be isolated before they are permitted to enter the herd. It does not seem plausible that, if it requires two clean annual tests to accredit a herd, only sixty days' isolation is necessary to accredit individual added animals, regardless of their source.

The modes of transmission and dissemination of disease-pro-

cluding organisms are peculiarly different for almost every disease. The transmission of rabies requires the bite of the rabid dog, and to prevent its spread you quarantine or destroy the dog. To prevent the spread of southern cattle fever you destroy the tick or the intermediate host containing the cause. In scabies the mite, which is the cause, is destroyed. In other diseases methods of preventive vaccination are used. In still others a combination of methods is required, such as quarantine; vaccination, slaughter of affected animals and proper disinfection. In most diseases dissemination is dependent upon the movement and introduction of animals susceptible to the disease under question. However, we believe it is too often overlooked that other species and agencies as well as persons may be the means of dissemination or the source of infection. In this class can be mentioned dogs, cats, rats, mice, poultry, birds, insects, feed, feed sacks, crates, persons who travel from place to place, etc.

Recently an instance illustrative of this danger was brought to our attention. A cat, which had been sick for about a year, on autopsy revealed generalized tuberculosis. All of the discharges were examined and found to contain large numbers of tubercle bacilli. It is not unusual for cats to sleep or lie in feed bins, mangers and mows, and it will readily be seen how the cat just described may have spread the disease.

Dr. Schroeder of the United States Bureau of Animal Industry at a recent tuberculosis conference pointed out the danger from mice as spreaders of tubercle bacilli and especially emphasized the contamination of feed with their feces and by their death in feed bins. Conditions similar to these may account for the occurrence of tuberculosis in herds where the source of infection seemingly can not be ascertained. These small animals may be a greater factor than is generally supposed in the spread of other diseases.

Horses are generally regarded as the least susceptible of the domestic animals to tuberculosis, yet recently our attention has been called to three well-developed cases, and in each case the horse was stabled in close contact with cattle, several of which were tuberculous. Postmortems of these horses showed open, generalized tuberculosis.

In the foregoing instances tuberculin testing of the cows, dis-

posing of the reactors and cleaning and disinfecting the barns would not have eradicated the disease from the premises.

Federal, State, municipal and practicing veterinarians traveling from one place to another should be particularly careful that they may not be accused of transmitting disease. During the 1914-15 outbreak of aphthous fever careless veterinarians carried the disease from one place to another.

Stable construction and herd management are among the chief influences governing the spread of all transmissible diseases. Pearson said: "Any system of stable management that serves to bring diseased and healthy animals into intimate contact, that facilitates the deposit of tubercle bacilli within the reach of healthy cattle, that serves to favor the accumulation or the distribution of germs of tuberculosis, or to prolong their life in the stable, helps to cause infection. And, further, any system of herd management that tends to reduce the vital resistance of the animal by overwork or improper nourishment, or to depress the activity of the organs or functions by insufficient use, will favor the spread of tuberculosis by preparing the soil upon which the seed is sown."

Safeguarding the young stock is one of the most important features in disease prevention. Intelligent selection, mating and care of parent stock and management of the young are fundamental to the prevention of disease. Intelligence in selection of parent stock will determine to a large degree, in advance, the percentage of runts and faults of conformation which inhibit rapid growth and development. It has been proved that sunlight, fresh air, suitable food and good water put vim, vigor and vitality into growing young stock, thus insuring well-developed mature animals which can best resist disease.

Roosevelt said: "If you are going to do anything permanent for the average man, you must begin before he is a man. The chance of success lies in working with the boy and not the man." His statement can be applied, with equal force and effect, to the animal kingdom.

The environment and surrounding conditions, which include the owner, his family, his assistants and employees, the premises, their location and equipment, breeding, care, feed, water and sanitation, are factors that too frequently are not given the high rank they deserve.

A healthy animal, even though housed in an insanitary place,

will not contract disease until exposed to infection. This suggests the question, How are we to determine the presence or absence of infection on premises? Disease-producing germs thrive best in dirty, dark, damp places. It follows, then, that germs will thrive best and remain longest where the accommodations are favorable.

Practically all State and Federal laws which create departments of agriculture and bureaus of animal industry or livestock sanitary boards prescribe that they shall prevent, suppress, control and eradicate dangerous transmissible diseases of animals. What attention are the regulatory authorities giving to preventive measures? Are we giving equal attention to disease prevention as to control? Do the bulletins that are published contain as much information and place equal emphasis on disease prevention as matter of control? Do the journals, agricultural and daily papers, contain information pertaining to disease prevention? Do we hear from the public platform and in private conversation about the things that have to do with disease prevention?

On numerous occasions veterinarians have taken issue with health board authorities as to proper measures for safeguarding the milk supply. In the instances referred to the health officials recommended laboratory examination of the milk at destination as being sufficient protection to the consuming public. The veterinarians took the position that the principal inspection should be made at the seat of production on the farm.

In order to protect a stream of water from contamination we not only go to its source and inspect the water, but surround the very fountain springs and watersheds with safeguards to make contamination impossible. Is this not truly prevention, and are we veterinarians consistent when we advocate prevention as the outstanding principle in the case of a water or milk supply and practice the opposite theory when dealing with animal diseases?

In Pennsylvania we have a disease-prevention service in which our bureau cooperates with the leading stockmen and breeders' associations and clubs, realizing that their support is indispensable. We have a veterinarian specializing in disease-prevention work. His duties are to study the subject of disease prevention and formulate plans for preventing the occurrence of disease. This agent operates with the owner, the person in charge of the livestock involved, the attending veterinarian, the county agent

and the Federal and State district agents. A careful survey is made of all livestock on the premises, the buildings and their location, methods and practices for breeding, additions, feeding, watering and management. A full report with recommendations is sent to the central office and copies are distributed to the owner, local veterinarian, county agent and district, Federal or State and municipal inspectors. (The form used for this report is shown herewith.) In this way every cooperating agency knows of the defects and the recommendations and are in position to work as a unit in bringing about improvement. Too often work of this character is handicapped by lack of cooperation and through conflicting instructions. This special agent's work is supplemented by the regular field and laboratory force.

[Form used in reporting on inspection of premises.]

PENNSYLVANIA DEPARTMENT OF AGRICULTURE

BUREAU OF ANIMAL INDUSTRY

PREMISE REPORT

Completed examination and tuberculin test on herd owned by Mr. _____, P. O. _____, _____ County, with result that of _____ tested _____ reacted _____ suspicious.

If reactors were found, what instructions were given regarding cleaning of premises. _____

General plan of stable (character and condition) _____

Method of ventilating _____

Floor _____ Gutters _____

Describe drainage _____

Condition of yards _____

Care and housing of calves _____

I offered the following suggestion as to permanent improvements, arrangements of buildings and care of the herd: _____

Mr. _____ will make the following improvements or changes in the order enumerated below: _____

Date _____ 19____ Agent. _____

(For remarks use other side)

In regard to hog cholera, more attention has been given to its control, through the use of serum and virus, than to its prevention. The swine owners of the country have been led to believe that liberal use of anti-hog-cholera serum and hog-cholera virus is all that is necessary for hog cholera prevention.

Until matters that have to do with prevention are recognized as being of major importance, we can not hope to make satisfactory progress in permanently eradicating any disease.

Destroy the breeding places of flies and mosquitoes and those pests will become extinct.

Afford protection to herds and flocks that are now free from disease and there will be no disease to eradicate.

Instead of giving a list of conclusions we will give a few practical examples of disease prevention as they are being practiced in Pennsylvania today. I wish to say first in this connection that it is possible, and we believe practicable, to prevent every disease of a transmissible character in animals.

Many years ago in one of our large cities, when street cars were drawn by horses, one of our veterinarians was called to give advice on the treatment of sore shoulders which were causing disability in more than 50 per cent of the horses. He not only advised but insisted that the collars and hames be properly fitted, the manes kept smooth and the shoulders clean. His advice was followed, with excellent results, the percentage of sore shoulders being reduced to less than 10 per cent.

One of our leading breeders started with twelve head of cattle, and from this foundation, with proper veterinary advice, has built up a large herd. He adopted the motto, "A cow that leaves the farm must not return." During the ten years of his breeding experience there has not been a case of infectious disease in his herd. That was prevention. The same methods have been successful in other herds of more recent origin.

Another breeder went along for a period of ten years, building up a splendid Guernsey herd without the appearance of any infectious disease. He then sought new blood, without proper advice, and unknowingly introduced abortion to his premises. Three months later the disease was recognized. The newly acquired cattle were isolated and the premises thoroughly disinfected. The abortions ceased and there has been no return up to this time.

Another herd of over 150 head of cattle may be cited, in which nearly one year ago abortion was in progress. Up to that time six or seven cows had aborted. Preventive measures were enforced, and in addition to those that had aborted eight other cows were taken from the herd, and not a single case of abortion

has occurred in the herd since, although one of the isolated cows aborted about three weeks later.

In another herd of over 200 head, for the past ten years, with the exception of the last three, a large number of cases of abortion and calf scours occurred each year, and in that herd probably 20 per cent of the older cows would react at the present time to serological tests for abortion; but for the past three years there has not been a single case of abortion. Each pregnant cow was placed in a specially constructed stable near calving time and not returned to the breeding herd until after her genital tract was free from discharge and thoroughly clean. The calving stall was then effectively fumigated and made ready for the next cow. Several breeders are working a plan similar to this at the present time.

These same premises at one time were badly infected with tuberculosis, and after it had been eradicated preventive measures were put into operation, and there has been no return of tuberculosis for at least four years.

In this same herd calf scours was successfully prevented by giving the dam a clean place at parturition time and keeping the calf in a clean place for at least one week after birth. Calf scours has been prevented on several farms in the same way. We know of several instances where it seemed impossible to raise any calves, but when the above practice is put into operation no losses from white scours occur. White scours is successfully and practically prevented by giving the dam a cleaned and fumigated stall at parturition time, the calf being kept in that clean stall or another similarly cleaned one for about one week after birth.

A farm devoted to the raising of purebred hogs, said to be the largest of its kind, was kept free from transmissible swine diseases, though situated in a district where cholera was prevalent. This was accomplished by preventive measures, such as thirty days' isolation of newly purchased swine, proper arrangement and sanitary equipment of buildings and pastures, careful inquiry into the sources of purchased feeds, frequent observance of the physical condition of each member of the herds, and the applying of approved methods of feeding and breeding.

It has been demonstrated on numerous occasions that proper housing, ventilation and management are the greatest measures in the prevention and repression of poultry diseases.

Johnie's disease of cattle is becoming of serious importance in some herds, and in our State when it has once gained foothold it is the most baffling of all diseases. Fortunately not many herds are afflicted. The best that we can recommend is that breeders should be very careful not to buy from affected herds.

At the 1913 meeting of this Association it was the unanimous opinion that the public watering trough was one of the most important factors in the transmission of glanders and the individual drinking cup one of the best methods to prevent transmission of that disease. On numerous occasions it has been proved that those opinions were a stimulus to the installation of proper preventive measures.

We suggest, in order to bring about more interest and to stimulate more enthusiastic action in this subject, that the following be given consideration and study by members of this Association:

1. Let prevention of disease, rather than disease itself, act as the medium that brings the animal husbandman and the veterinarian together.

2. Closer unity of Federal and State officials dealing with animal diseases, with the various health and educational departments, physicians, hospitals, medical and agricultural colleges and other institutions of learning.

3. Veterinary and agricultural colleges could do more toward disease prevention if stress were placed on this subject during the courses of instruction.

4. There should be a better understanding by the people of the intercommunicability of diseases and the relation of animal diseases to public health.

5. Federal, State, municipal and practicing veterinarians should become better acquainted with, recommend and practice preventive methods.

6. Areas now free from disease may be kept free if the owners of livestock are aware of the danger of purchasing from outside areas and are familiar with the necessary precautions against disease.

7. Federal and State officials should give more attention to maintaining the health of animals on premises where there is no reason to believe transmissible disease exists.

8. A system of identifying animals whereby they may be traced to previous owners.

9. Closer cooperation of State, Federal and municipal agents,

boards of health and butchering establishments with the view of finding the source of diseased animals.

10. The vendor of a diseased animal, sold for food purposes, should be liable for the purchase price when such animal is condemned in the hands of the butcher. In this connection special legislation would be helpful.

11. Legislation requiring a tuberculin test of cattle and mallein test of horses offered at public sales.

12. Strict legislation on the spread of hog cholera and bovine abortion and other transmissible diseases through public sales.

13. Poultry and sheep diseases cause large losses which could be materially reduced if our profession were to give more attention to their prevention.

14. Much could be done by quarantine, sanitary and disinfecting measures in preventing influenza in horses and other diseases incidental to shipping, distemper in dogs, etc.

15. Disinfecting of stockyards and stock cars.

16. The value of more publicity through agricultural and daily press and county farm bureau organizations.

We recommend that this Association appoint a Committee on Disease Prevention to consider the above suggestions and make additions; that the committee report at the next meeting of this Association.

Should not the members of this, the greatest of all associations of its kind, take advantage of the above examples, which were made possible by some of our outstanding, wide-awake and thinking stockmen, who, by employing the fundamental principles of prevention, have gone a step beyond us? Should we not take their examples as our fundamentals and formulate methods which will do for others what these men have done?

We firmly believe that preventive measures are equally important as detecting and removing diseased animals. We wish that more could see and appreciate the importance of prevention.

We are thoroughly optimistic of the future and we believe that it holds much in store for our profession and stockmen. Our appeal is that veterinarians and stockmen unite more closely than ever before; that we think and work in unison as smoothly as the swinging of a pendulum, to the end that we can spend at least half of our time and knowledge in devising better methods of disease prevention rather than in concentrating all our agencies upon one line. Until that is done, we veterinarians will not be in position to act in capacity of expert advisers.

Veterinarians have a tremendous responsibility. Are we exerting ourselves to the fullest extent to meet this responsibility adequately?

If we are to merit the continued confidence of stockmen and their organizations as expert advisers, we must be able to do infinitely more than to diagnose and treat disease.

Stockmen are equally concerned in knowing how to prevent disease.

DISCUSSION

DR. MAURICE C. HALL: The paper which I will present is along the same line as Dr. Munce's paper, and I am under the impression that it does not entirely agree with some of the statements. As you all know, however, when a paper is read to you it is very easy to misunderstand it or to get a false impression, and I am not sure that I have understood Dr. Munce correctly. However, I think he took the position that prophylaxis was always feasible in the transmission of a disease, and if my understanding was correct, I can hardly agree with that statement. I think you all recall that during the "flu" epidemic during the war a great many elaborate precautions of a prophylactic nature were taken, to no avail. You will recall that in connection with yellow fever, before it was known that the mosquito was the transmitter of the disease, elaborate prophylactic measures were used. It is possible to figure out prophylactic measures even where a life history is not well known, but under those conditions the measures are not usually feasible or practical, and therefore not valuable.

DR. J. A. KIERNAN: I am in thorough accord with all the sentiments expressed in Dr. Munce's most admirable paper. I rise only to call attention to a reference he made to comments from livestock owners respecting the accredited-herd plan. My understanding of that comment was that animals added to accredited herds are permitted to be introduced and fully accredited after being subjected to two tuberculin tests sixty days apart.

From the very inception of the accredited-herd plan it was recognized that it was not 100 per cent perfect, but it had to be made a practical operating plan that would fit into the business of raising livestock. It is true that animals after two tests may be added to herds, but that it works out in a practical way I want to demonstrate by data obtained in the retesting of the 8,000 accredited herds that are upon the list. Some inquiries were made as to the number of accredited herds removed from the list during the year. These data cover the fiscal year terminating June 30, 1921. It is true that not all of the 8,000 herds on the accredited list were subjected to a retest, but upwards of 3,000 of those herds were. There were removed from the accredited list during that time 87 herds. Eighty-seven herds of animals that at a previous test had passed the tuberculin test upon a second test were found tuberculous and were removed. For other causes there were removed other animals; for instance, animals exposed to infection at shows, at livestock expositions; 27 herds were taken off the list for that reason. Of the 87 herds, the total number, there were but 33 herds containing more than 2 animals and 14 herds that contained more than 3 animals.

I think any kind of a regulation or any kind of a business that has so few errors and so few omissions in it, as has this accredited-herd plan, can stand such criticism as has been made by the owners. As I say, it is a practical proposition and was made for the practical owners.

There was another matter mentioned in the paper. I don't want to misquote Dr. Munce, but my understanding was that during the foot-and-mouth disease outbreak complaint was made that the infection was spread by veterinarians and inspectors. I don't know how that was in some territories, but I had the privilege of working in three or four States and in McDonough County, Illinois, in which there was more infection than in any similar area in the United States, having more than 200 herds condemned in that area. We had occasion to trace the spreading from farm to farm in defense of that very accusation that inspectors and veterinarians were distributing the infection, and in not one single instance could we find, after an exhaustive investigation, where a veterinarian or inspector had spread the disease. We traced the origin and spread of infection, and presented the results at the conference on foot-and-mouth disease held in Chicago in December, 1914, when a number of livestock owners and lawyers were casting aspersions upon the veterinary profession that they were spreading the disease, and we outlined the facts and how the disease was spread.

COMMISSIONER J. M. WHITTLESEY (Hartford, Conn.): Dr. Munce, I think, is portraying somewhat eastern conditions. I am from New England. I think Dr. Munce's paper is one of great importance. I wish to call your attention to a few herds we have found in Connecticut where evidently the great spread of tuberculosis was the fault of feeding and managing the cattle. We found some suffering from malnutrition. We found a very heavy percentage of tuberculosis in herds that were crowded to the limit of production and housed in barns the year around and forced during the war to produce the maximum amount of milk and that suffered physically. We got a tremendous spread in those herds. I presume that paper of Dr. Munce's will interest those who are dealing with eastern conditions more than the western cattlemen, but it certainly is a very important subject to me.

DR. CARY: I think this is a very valuable paper. I think one of the most valuable suggestions made by Dr. Munce was the suggestion that we have a committee appointed by this section or the general association to cover this subject and bring out the question of prevention of various conditions in various parts of our country. I think if it is in order a motion ought to be made to that effect and have a committee appointed. Whether it should be done before this section or the general house is another question, but I think that should not be overlooked.

CHAIRMAN JAKEMAN: Dr. Munce, do you wish to reply to the discussion?

DR. MUNCE: It was not my intention to reply. I did not intend to precipitate any discussion or any criticism of the accredited-herd plan, but I simply expressed as best I could the questions that were brought to our attention by some of our good stockmen. They asked this question, If it is safe to accredit cattle whose history in many cases is unknown, why isn't it safe to accredit herds on two negative tests sixty days apart whose history is known?

On the matter of spreading infection by foot-and-mouth disease, I simply tried to emphasize by that illustration how important it is that veterinarians—I wasn't speaking of inspectors or any other branch of the veterinary profession—be exceedingly careful about carrying infection. We had in Pennsylvania several cases where foot-and-mouth disease was carried by careless veterinarians.

I made the suggestion in reference to a committee because I felt that the subject was being neglected as it is, and it is of such tremendous importance that perhaps it might be well to consider that suggestion, if the Association sees fit, at the general session.

GENITAL INFECTIONS IN THE BULL

By HERBERT L. GILMAN

*Department of Obstetrics and Research in the Diseases of
Breeding Cattle, New York State Veterinary College,
Cornell University, Ithaca, N. Y.*

THE STUDY of the infections of the genital organs of the bull, and the associated structural changes, offers practically a virgin field for intensely interesting research work. Veterinarians and breeders have long recognized the bull as a potential factor in the spread of genital infections in the herd, but even then he was usually looked upon as merely a mechanical carrier of the organisms. The fact that he might be an active spreader has been quite generally overlooked. Too frequently the ability of a bull to copulate in an apparently normal manner is taken as conclusive evidence of his procreative powers. The question as to whether or not the semen contained normal active spermatozoa, and whether the genital organs harbored organisms capable of being transmitted to the female during ejaculation of the semen, seems to have been entirely disregarded until comparatively recently.

It has been demonstrated by Carpenter (1) that the genital organs of cattle harbor several species of organisms, other than the Bang bacillus, which interfere with reproduction. The question is, Does the genital tract of the bull become infected with these same organisms, and if so, are they eliminated with the semen and is the female infected during copulation? Likewise, what gross and histological changes occur in his genitalia, and if so, what functional changes result therefrom? Clinical evidence clearly incriminates the bull in a large number of cases, and the clinical findings, substantiated by laboratory diagnoses, demonstrate that the bull often becomes a dangerous source of genital infections in the herd.

Disregard for the part played by the male has by no means been confined to the veterinarian, for the physician likewise has, until comparatively recent years, almost entirely neglected or failed to appreciate sterility in the male. His part also in the transmission of the general genital infections has been given little or no consideration. Careful and painstaking study of the subject has proven that the percentage of male sterility is quite

high, and that he plays a very important part in the spread of venereal infections other than those of a specific type. Even otherwise normal healthy men are occasionally encountered in whose semen no spermatozoa are found. Conditions are practically identical in the bull as far as the work has been carried on. The genital organs of the bull are even more accessible to clinical examination than those of man, and his semen more easily obtained.

The bull, when once infected, is a much more dangerous spreader than the cow, due to his intercourse with so many females. The cow may spread her infections merely to the bull or bulls with which she may copulate, while an infected bull naturally becomes a disseminator to as many females as he may be called upon to serve. It remains, therefore, for the veterinarian to consider the bull in the study of genital infections in every herd which he is called upon to treat. Comparatively too much attention has been given to the diseases of the cow, with practically no consideration of the source and mode of transmission of the infections.

References to the part played by the bull in the spread of "contagious abortion" as caused by the Bang bacillus are quite numerous. Bang (2) originally called attention to this fact, but came to no definite conclusions. Later McFadyean and Stockman (3) attempted but failed to infect cows by using a soiled bull for service. Hadley and Lothe (4) state: "A large number of stockmen hold that the bull is an important factor in the transmission of contagious abortion in herds. A smaller number believe that the bull acts merely as a passive carrier of the abortion disease and is not actively concerned in the transmission." Their attempts to infect abortion-free heifers with abortion-infected bulls were negative.

Buck, Creech and Ladson (5) applied the agglutination test to 325 mature bulls, of which 288 were negative and 37 positive. *Bacillus abortus* was isolated from five animals, of which three showed marked lesions, two in the seminal vesicles, and one in the left testicle. They conclude: "*B. abortus* may involve organs of the generative apparatus of bulls, producing chronic inflammatory changes. Of the generative organs, the seminal vesicles appear to furnish the most favorable site for the lodgment and propagation of abortion infection."

Schroeder and Cotton (6) cite the case of a bull which re-

acted to the abortion test, and on postmortem *B. abortus* was isolated from an abscess of one epididymis. They state: "Our attempts to produce a similar case of infection artificially failed; and, in agreement with the difficulties many investigators have had to obtain incriminating evidence against bulls, we have thus far failed to infect bulls in any way that justifies the assumption that they are important factors in the dissemination of abortion disease." Further, they conclude: "Regarding the dissemination of abortion disease by bulls we may say, however, that it would be foolhardy in the dim light of our present knowledge to take liberties with reacting bulls, or bulls from infected herds, or promiscuously used bulls."

The work so far discussed shows that *B. abortus* has occasionally been isolated from the genitalia of bulls, and that they do at times react to the agglutination and complement-fixation tests with *B. abortus* antigen. Attempts at artificial inoculation by natural channels have failed, with the possible exception of McFadyean, Sheather and Minett (7), who were able to infect the bull by the prepuce in two cases and by mouth in one case. The results, however, are by no means conclusive, and the duration of the infection and transmission to the cow are not discussed. They conclude, nevertheless, that cattle of any age and either sex may be infected by natural channels with the bacillus of epizootic abortion. Proof of the transmission of *B. abortus* by the male to the female has at no time been brought forward, and even the possibility of his acting as a mechanical carrier is merely assumed.

Hadley (8) states that unquestionably the male often becomes infected with germs that produce the various secondary diseases in the female, which are more properly classed under the more inclusive term of "abortion disease." Further on he states that douching the bull before and after service certainly will keep the bull from transmitting the organisms that cause the secondary infections. One might infer from this that Hadley believes that the genitalia of the bull become infected with many varieties of organisms, and that they are transmitted to the female, producing disease in her reproductive canal. However, he does not state just what the secondary infections are. Even though the internal genitalia did become infected, and the organisms were eliminated during ejaculation, no amount of douching would prevent the transmission of the infections.

The work so far reviewed has been limited to infection with and the transmission of *B. abortus*, with no attention to or regard for other infective agents which have been proven to be intimately associated with diseases interfering with reproduction in the female. While this organism is a very vital factor in the problem of genital infections, the organisms usually referred to as "secondary invaders" are of primary importance and must never be overlooked if one is to get a clear understanding of the problem. Their role is by no means insignificant.

The semen, until the work of W. W. Williams (9), received only slight attention in the study of sterility in cattle. Its normal character has been simply taken for granted. In his work he calls attention to the importance of an examination of the semen in diagnosing sterility in the bull, giving methods for the collection of samples, staining, and some of the abnormalities encountered. The work is fundamental and should stimulate interest in this important method of diagnosis. Later he goes into a more extended discussion of the problem, concluding that the clinical examination is of vital importance. Of 40 bulls examined, he finds that 20, or 50 per cent, showed lessened fertility, and others aside from these showed minor changes in the genital organs or semen. W. L. Williams (10, 11) calls attention to the same fundamental problems, and in a subsequent paper (12) states: "Clinical studies now indicate with great clearness that the bull is an active spreader of that group of genital infections which cause sterility, abortion and related phenomena."

Most of the present studies have been carried on in cooperation with the last two mentioned authors, in the hope of correlating the clinical and laboratory findings.

In order to bring out the pathological changes encountered, some points in the anatomy, gross and histological, and physiology will be briefly reviewed.

The testicles are relatively large, measuring 14 to 17 cm. in length, including the epididymis, and 6 to 8 cm. in diameter. The tunica albuginea is quite thin and consists of connective tissue which is rich in elastic fibers. On account of its distinct connective tissue structure it is not distinguishable from the tunica vaginalis which is fused with it. Inside the tunica albuginea is a loose layer of connective tissue, which, on account of its rich supply of blood vessels, is termed the tunica vasculosa.

The parenchyma of the testis is of a yellowish gray color. The mediastinum testis is an axial connective tissue structure running through the gland, star shaped on section, and sending numerous connective tissue strands between the lobules. The lobules consist of the seminiferous tubules, which, on account of the courses they take in the different regions, are divided into three groups. The peripheral tubules are the much-contorted tubuli contorti. These join up to make the tubuli recti, which near the mediastinum break up to form a network, the rete testis. The rete proceeds through the mediastinum, to form the efferent ductules which break through the tunica albuginea, to form a part of the head of the epididymis. The tubuli contorti, which form the spermatozoa and make up most of the parenchyma, have a width of 120 to 200 microns. The lobules are made up of a peripheral thin membrana propria and the seminal epithelium, which consists of the essential sperm-forming cells and the cells of Sertoli. The sperm cells are many-layered, consisting of the peripheral layer of spermatogonia. These in turn divide, giving rise to a more central layer of primary spermatocytes, which in turn divide through secondary spermatocytes, spermatids, and finally the spermatozoa are formed. The cells of Sertoli are large cells of indistinct outline, sending protoplasmic processes out into the lumen. In the final stage of transformation of the spermatids into spermatozoa, the latter bury their heads in these protoplasmic processes of the Sertoli or nurse cells which furnish them with nutritive material. Finally the spermatozoa mature and become free in the lumen. The interstitial connective tissue between the tubules contains numerous large interstitial cells. They are comparatively delicate, slightly granular cells with abundant protoplasm which contains many fat globules. These cells furnish an internal secretion which governs the development of the secondary sexual characters.

The head of the epididymis is made up of lobules formed by the much-coiled efferent ductules proceeding from the rete. These ductules unite to form the body of the epididymis, which remains quite coiled and runs along the posterior medial part of the testicle, to which it is more or less closely attached. At the lower extremity of the testicle it forms the tail of the epididymis, finally ending in the ductus deferens. The epididymis is lined by a pseudo-stratified, columnar, ciliated epithelium.

Outside this is a *membrana propria*, a circular muscular layer, and a connective tissue coat.

The vas deferens is quite narrow (2 mm.) and runs from the tail of the epididymis to the *colliculus seminalis*, where it empties into the urethra. At first it is lined by epithelium like that of the vas epididymis, but changes over into a stratified columnar type with occasional motionless cilia. The *tunica propria* is a thin fibrous layer. The submucosa consists of thin connective tissue. Three muscular coats are present, an inner thin longitudinal layer, middle circular, and outer longitudinal layer. These are surrounded by the adventitia, made up of connective tissue, elastic fibers and scattered longitudinal muscular cells of the internal cremaster muscle. The function is the conveyance of the spermatozoa with some of the seminal fluid from the epididymis to the ejaculatory duct. Near the posterior part of the bladder the two ducts are in close apposition, and for 10 to 12 cm. dilate to form the ampullæ. Here the mucous membrane becomes much plicated and not unlike the folds at the fimbriated end of the oviduct.

The seminal vesicles are compact glandular structures lying on either side of the median line, dorsal to the ampullæ and ventral to the rectum. In the mature bull they measure 10 to 12 cm. in length, 4 cm. in width, and about $2\frac{1}{2}$ to 3 cm. in thickness. The glands are quite tortuous and are often asymmetrical in size and shape. The excretory duct of each opens into the urethra in common with the ampullæ of the vasa deferentia. Microscopically the gland consists of vesicles lined by pseudo-stratified columnar epithelium. On the outside of the gland is a thick connective tissue layer which sends thin trabeculae in between the vesicles or alveoli. The function is to supply the principal fluid content of the semen. Spermatozoa occasionally work up into the lower part of the gland, but ordinarily the fluid is a gray, milky, mucoid material, containing few or no spermatozoa.

The *colliculus seminalis* is a rounded prominence about 2 to 3 cm. in length, at which open the ducts of the vas deferens and seminal vesicles by small slit-like openings. There is no distinct ejaculatory duct in animals. The function of the *colliculus* is to prevent admixture of urine with the semen by shutting off the upper part of the urethra during ejaculation.

The prostate consists of two parts, which are continuous with



Fig. 1—Normal testicle of bull. (High power magnification.)



Fig. 2—Testicle of bull, showing marked desquamation and degeneration of the seminal epithelium lining the tubules. (High power.)



Fig. 3—Normal seminal vesicle of bull. (High power.)

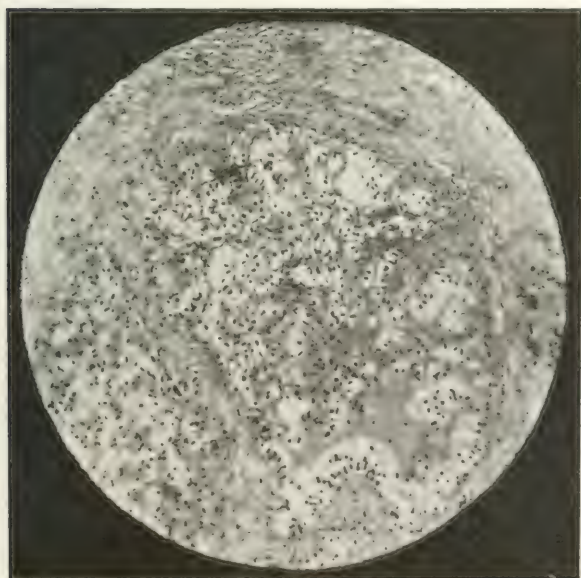


Fig. 4—Seminal vesicle of bull, showing advanced stages of degeneration and desquamation. The lining membrane of the vesicles has disappeared and the lumina are filled with detritus and exudate. (High power.)

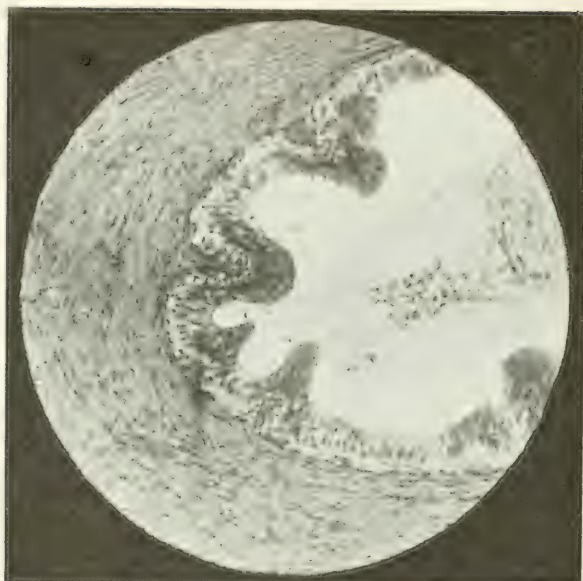


Fig. 5—Normal ductus deferens of bull. (High power.)

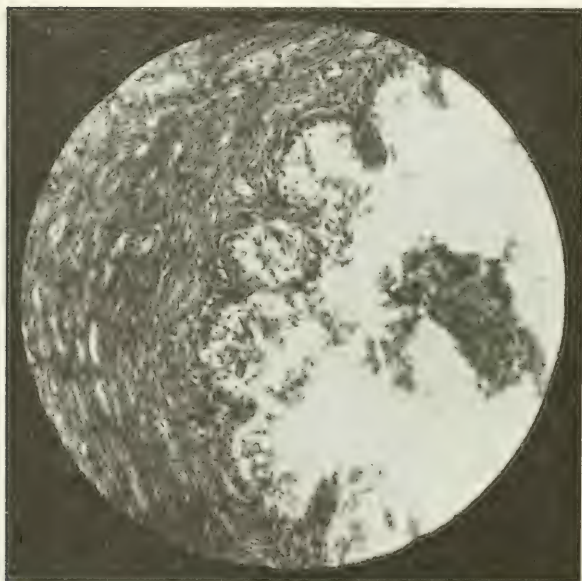


Fig. 6—Ductus deferens of bull, showing desquamation of the lining membrane and exudate into the tube lumen. (High power.)

each other. The body is 3 to 4 cm. in width, 2 cm. long, and 1 to 1.5 cm. in thickness, extending across the dorsal surface of the neck of the bladder at the origin of the urethra, and over the colliculus seminalis. The pars disseminata surrounds the pelvic part of the urethra. Dorsally it is about 10 to 12 mm. thick and ventrally thins out to about 2 mm. The gland has a branched tubular structure, the interlobular tissue of which contains much unstriated muscle. The prostatic ducts open into the urethra in rows, two of which are between two folds of the mucous membrane that proceed backward from the colliculus seminalis: two other series occur on either side, lateral to the folds. The secretion, the function of which is to furnish part of the seminal fluid and the principal stimulant to the motility of the spermatozoa, is of an acid reaction, milky, and quite albuminous.

The Cowper's glands (bulbo-urethral) are paired, oval structures, about 3 by 2 cm. in size and situated on either side of the pelvic part of the urethra close to the ischial arch. They are covered with the urethral muscle, and both empty into the urethra by a single duct. The structure is compound tubular mucous glands, the gland tubules of which are lined with a single layer of cubical epithelium, and the ducts with two or three layers of similar cells.

The semen when freshly ejaculated is a cloudy, tenacious, more or less coagulable fluid rich in albumen. It is weakly alkaline in reaction, and contains 80 to 90 per cent of water. Of the solid constituents there is 40 per cent of ash, of which three-fourths is calcium phosphate. Besides the spermatozoa, the semen frequently contains epithelial cells, leucocytes, concentric amyloid concretions and lecithin bodies. When cold, characteristic phosphoric acid salts are precipitated. The fluid content is the product of the tubules of the testicles, their excretory ducts and the accessory sexual glands. This is principally secreted by the ampulla or pars glandularis of the vas deferens and the seminal vesicles. These secretions are thick, homogeneous and gelatinous, resembling sago soup. The amount of semen ejaculated is about 5 to 10 c.c.

The spermatozoon of the bull consists of two principal parts, the head and the tail. The head contains the nucleus and is solely for the fecundation of the ovum, while the long and thread-like tail is for motility. The former, which is comparatively

large, is divided into a darker staining posterior part, an anterior lighter part, and often a still lighter oval area between the two. On the anterior part of the head is a sharpened edge, the aerosome, which serves the purpose of perforating the ovum. The tail is divided into three parts: connecting piece, principal part, and terminal filament. An axial filament runs through the entire length of the tail. The connecting piece, which is the thickest and strongest part, joins the tail proper to the head. It consists of the central axial filament, a spiral filament around this, and an outer mitochondrial covering. The principal part consists merely of the axial filament and a thin outer covering, while the end piece is quite thin and is made up solely of the uncovered axial filament. The length of the entire spermatozoon is 75 to 80 microns, including the head. The head is 9.5 microns long and 5.5 microns wide.

The spermatozoa are nonmotile when discharged from the testicle, and do not become motile until they come in contact with the prostatic secretion (Ellenberger, 13).

The technique used in the collection and staining of the spermatozoa is essentially the same as that described by Williams (9). The methods used in removing the genital tracts and cultural methods of the organisms are identical with those described by Carpenter and myself in the study of the female genital tract.

PATHOLOGY

The pathological changes encountered are quite numerous, but merely the nonspecific types will be considered here.

The testicle seldom presents gross alterations of structure except for abscessation, which, according to Williams, occurs more frequently in the bull than in any other domesticated animal. He also states that arrest in the development of the testes by which they remain soft, flaccid and somewhat smaller than normal is not uncommon. The epididymis is occasionally the seat of necrotic processes, as evidenced by swelling, tenderness and abscess formation. In two instances cases were encountered in which the head of the epididymis was much enlarged and firm, due to a chronic proliferative inflammation. On section the efferent ducts of the epididymis were much atrophied, the lining membrane was degenerated and desquamated, while the interstitial tissue was much increased in amount. Abscess formation may occur either here or at the tail of the epididymis,

where it is more frequently encountered. Occasionally the ducts show slight desquamation and some degeneration of the lining epithelial cells, without any gross manifestations. Microscopically, the testicular tissue is the seat of pathological processes. Perhaps the most frequent condition encountered is desquamation and degeneration of the seminal epithelium. The process may be seen in various stages, from only slight exfoliation to almost complete disappearance of the essential semen-forming cells (figs. 3 and 4). In one instance total disappearance of the seminal tissue with marked thickening of the membrana propria was encountered, associated with an extensive increase of interstitial tissue. In every genital tract examined (146) I have failed to find one in which there were not present many small strands of connective tissue between the tail of the epididymis and the adjacent part of the parietal layer of the tunica vaginalis. In some instances infection was present, while at other times the strands were evidently the result of some previous infection.

The ductus deferens frequently shows degeneration and exfoliation of the lining membrane (figs. 5 and 6), and when this occurs it is usually associated with changes in either the testicle or seminal vesicles.

In man the duct becomes occluded by a chronic inflammation, but so far I have failed to find evidence of this condition in the bull. Undoubtedly, however, this condition does occur occasionally.

The seminal vesicles are perhaps the most common seat of infection and pathological changes. The acute form of inflammation is accompanied in some instances by enlargement either of one or both glands. On rectal palpation this may be quite easily distinguished, and pinching of the part causes a distinct flinching and evidence of pain.

Together with the enlargement it becomes somewhat softer and flabby or even hard in the early stages. On microscopical examination there is usually extreme hyperemia of the entire part, with varying degrees of desquamation and degeneration of the epithelium lining the vesicles. The normal clear mucous secretion becomes mixed with fibrin, leucocytes and cellular debris. In the more severe types the entire epithelium becomes desquamated and necrotic with more or less loss of definite structure in the gland. Cystic inflammation may occur, in which

case the cysts may involve only one or two lobules or occasionally the entire gland. Abscess formation is not infrequent, in which case the entire gland becomes made up of small abscesses, or the entire gland may be one large necrotic encapsulated mass. Chronic inflammation is evidenced by a distinct enlargement and firmness of the gland. On microscopical examination most of the gland is composed of firm sclerotic tissue in which here and there one finds remains of the degenerating vesicles. This type may or may not be accompanied by adhesions to neighboring parts. In one case encountered, the glands were much enlarged, sclerotic and almost lost in a large mass of adhesions.

The prostate and Cowper's glands no doubt are frequently involved in inflammatory processes. However, unfortunately, these glands were more or less neglected in the work, with the result that changes may have been present though not detected.

The semen presents a most interesting and essential subject for routine examination and study. While the advances made so far have been more or less elementary, the work has demonstrated that its study is a very valuable aid in the diagnosis of infertility in the bull. Not only is the seminal fluid frequently the carrier of several varieties of bacteria associated with genital infections, but in a large percentage of cases the essential spermatozoa are abnormal either in their motility or morphology or both. Likewise the seminal fluid is subject to changes which are often detrimental or injurious to the existence of viable spermatozoa. . .

It has been demonstrated that very frequently the bull harbors streptococci, micrococci and other organisms associated with genital infections in the female. These organisms become localized in the seminal vesicles and testicles, and during ejaculation of the semen are discharged and deposited in the vagina of the female. Bacteriological studies on the semen are not on the whole entirely satisfactory, but are sufficient, I believe, to demonstrate this fact. The method employed consisted in douching and disinfecting the vagina and sheath after the method suggested by Williams. Samples of vaginal mucus were then taken for study, following which the semen was removed after coitus. The vagina usually harbors organisms, though on smear but a few are ordinarily seen. In the bulls of high fertility the semen obtained by this method failed to show many organisms, most or all of which probably came from the vaginal mucus.

The semen from many sterile bulls or those of low fertility, however, clearly showed that a large number of organisms must have been eliminated with the semen. Likewise the organisms isolated agreed culturally and morphologically with those found in diseased seminal vesicles and testicles. Perhaps some of these organisms were brought in by a penis contaminated by the exterior of the cow, but the number and type of organisms found would tend to make this source of contamination improbable.

The seminal fluid, besides being frequently laden with bacteria, is in many cases abnormal. In one instance the fluid was quite thick, of a yellowish green color, and of a distinct acid reaction. The secretion from the seminal vesicles was later found to be of this same character, and the glands had undergone diffuse abscess formation. The fluid may frequently contain pus, or rarely blood. Decrease in the amount of fluid, or a thin watery condition, is not infrequently encountered. In one instance the semen appeared in all ways like a thin, serous fluid.

Distinct changes in the motility and morphology are, however, the main features to be looked for in the study of the semen. Not infrequently complete azoospermia is met with, however, with quite distinct changes in the character of the seminal fluid. In the examination of the motility the semen is best studied with the use of a warm stage, or if this is not available, a drop of the semen may be placed upon a warm slide. Motility may be observed with the aid of the low or high power lens, though often it is best to use a cover-glass and the oil immersion. Normal vigorous spermatozoa show a vigorous lasting motility which persists for hours, or even days under proper conditions. Abnormalities of motion are manifested by sluggish motion of all or part of the cells present, abnormal types of motion, or, in many instances, entire absence of motion.

Anatomical changes encountered were mostly confined to loss of the tail, and irregularities in staining of the nucleus. Some specimens show mostly headless sperms in the field, while others show but a few without tails. The irregularities in staining are manifested by unusual difficulty in obtaining a clear differential staining of the head. Abnormal forms such as spermatozoa with two heads, thickening of the connecting piece of the tail, diminutive size of the head, etc., are by no means uncommon. Their significance is not understood, but they are

probably the product of some derangement in the seminal epithelium.

The bacteriology of the male genital tract was studied upon the genitalia of 10 normal young (6 to 8 weeks) calves, 2 mature fertile bulls and 12 mature infertile bulls. Four aborted fetuses and 5 calves dying from calf infections (scours and pneumonia) were also cultured, as well as 11 bulls slaughtered at an abattoir. In the latter group no history was available, as was the case in nearly all of the others.

The seminal vesicles and testicles of the normal calves were sterile in all but two cases. From these two tracts a staphylococcus was isolated from one seminal vesicle of each. In one aborted fetus a streptococcus was isolated from both the seminal vesicles and testicles, this same organism being obtained from the heart's blood. In another *Bacillus coli* was isolated from all parts, with a general colon septicemia. Micrococci and streptococci were in several instances obtained from the seminal vesicles, testicles, or both, from this group of animals. In each instance the organisms were identical with those isolated from other parts of the fetus or calf.

Adult bulls of known fertility were naturally difficult to obtain, only two being available for examination. These were from the experimental herd kept by the department, and have always had an excellent breeding history. One bull had a severe attack of scours when a few weeks old, while the calfhood history of the other is not known, he having been bought after sexual maturity. Cultures from the genital tract from the first-mentioned bull were entirely negative except for the presence of a streptococcus isolated from the left epididymis and left scrotal sac. All organs were normal except for numerous fine connective strands running from the tail of the epididymis to the adjacent part of the parietal layer of the tunica vaginalis in both testes. The tract of the other failed to show any organisms. The only evidence of any abnormality was the presence of the same fine connective tissue strands as were in the other tract.

In the mature sterile bulls, or those of low fertility, there was a comparatively wide variation in the type of organisms encountered, though the streptococci and micrococci were the most common invaders. The tail of the epididymis and the seminal vesicles are the most common seat of infection, the latter being infected in nearly all sterile bulls so far examined. One very

interesting case noted was that of a bull with a history of suddenly becoming sterile. The semen was semifluid, greenish yellow in color, and contained very few nonmotile spermatozoa. On postmortem the vesicles had undergone abscess formation and contained the same greenish yellow material which had been discharged during copulation. *Streptococcus hemolyticus* and *Pseudomonas pyocyaneus* were isolated from both vesicles. In one bull a watery condition of the semen was found to be due to cystic degeneration of the vesicles.

The tracts obtained from abattoir bulls were not always infected, but most of those examined bacteriologically demonstrated that the infection is quite widespread. Gross and histological changes of the seminal vesicles were by no means uncommon, as well as degeneration and desquamation of the seminal epithelium of the testes.

Micrococcus aureus and *albus* were isolated in nearly all cases, though usually associated with *Streptococcus viridans* or *hemolyticus*. When checked up with the organisms found in the semen, the two appeared to be identical in every way. *Bacillus coli* was encountered but twice, and then in the vesicles.

I have so far failed to obtain *Bacillus abortus* from any tract, either by direct culture or guinea-pig inoculation. The agglutination tests with *B. abortus* antigen were all negative except for two bulls from the abattoir. In three instances an organism was isolated from the seminal vesicles which agreed culturally and morphologically with *B. abortus*, but guinea-pig inoculation with the cultures of the organism failed to identify it as the Bang bacillus. Likewise an antigen made from the cultures were not agglutinated by positive abortion serum.

Clinically, the diagnosis of sterility rests principally upon an examination of the semen, testicles and seminal vesicles. As stated before, in examining the semen one should note the reaction, quantity of sediment and character of the fluid. The spermatozoa should be examined for the relative number present and their motility, which may be vigorous, sluggish or absent. In staining one must look for poor staining of the head and for morphological abnormalities. The presence of bacteria, leucocytes or an unusual number of desquamated cells is to be noted. The testicles in each case should be examined for abscess formation, atrophy or any chronic enlargement, especially of the epididymis.

The seminal vesicles in many cases will, on physical examination, be enlarged and firm, soft and flabby, or otherwise diseased. Abscess formation, or cystic degeneration is not uncommon, and occasionally the glands can not be palpitated, due to their being lost in a dense mass of adhesions to neighboring structures. Sensitiveness on pressure is usually evidenced by a distinct flinching on the part of the animal. On the other hand, the vesicles may show no macroscopic evidence of inflammation, it being upon on microscopical section that the gland is found diseased. The spermatozoa will not live in a fluid not suited to their delicate requirements, and since the vesicles furnish most of the seminal fluid which is generally materially altered when the gland becomes infected, these glands should be given a careful examination. Abnormal semen may not be associated with diseased testes, but this is almost invariably the case with diseased seminal vesicles.

While the work so far is but in its infancy, the results are such as to demonstrate that the bull often becomes infected and may be a dangerous source of infection in the herd. The semen is very frequently abnormal and contains bacteria which are similar to or identical with those isolated on postmortem examination from diseased genitalia, especially the seminal vesicles. Likewise these organisms found in the semen are very frequently associated with a wide variety of genital infections in the female. Clinically, as stated by Williams (12): "The cows served by one bull conceive in larger percentage than those served by another. Cows pregnant by a bull of low fertility abort in larger ratio than cows bred to bulls of high fertility. Those cows which are sterile after having been bred to bulls of low fertility often prove persistently sterile when bred to highly fertile bulls. In these cases not only has the bull ejaculated an infection fatal to the spermatozoa and ovum of the coitus concerned, but he has implanted in the genital tract of the cow an infection which prevents fertilization in the future by a fertile bull."

One valuable purebred animal coming to my attention had previously given birth to four normal healthy calves. She was then bred to a pedigreed bull whose history was not looked into. Abortion took place at eight months, with death of the calf, and the cow barely recovered from a severe septic metritis. It would not be surprising to find that her breeding career was at an end.

In one purebred herd attended by Dr. W. W. Williams, service to certain bulls was invariably followed by cervicitis, which later developed into salpingitis, leaving cow after cow hopelessly sterile. The semen and, as found later, the seminal vesicles of these bulls contained virulent streptococci and the seminal vesicles were badly diseased, as demonstrated by clinical and histological examination.

The finding of the fine connective strands between the tail of the epididymis and the adjacent part of the parietal layer of the tunica vaginalis in every bull examined so far demonstrates the extent of the presence of some infection of the male genital tract at some time during life. The presence of organisms in the genital tracts of aborted fetuses and of calves dying from some form of calf infection may signify that infection localizes in the parts early in life, either to die out or lie dormant until sexual maturity, when it becomes intensified, especially by excessive sexual strain. The fact that the tracts from the healthy calves failed to show any bacteria, while those from diseased calves and aborted fetuses usually harbored bacteria, tends to the belief that bacteria are not normally found in the male genital tract. This appears to be so in the young, at any rate. Of the two adult bulls with a good breeding history, one showed no organisms, and the other infection of only one epididymis and scrotal sac. It is interesting to note that the bull harboring the infection, which, by the way, was not discharged in the semen as far as I could find, had had the attack of scours while a calf. Both bulls, however, were used moderately and were douched before and after each service. The presence of the fibrous strands on the epididymis shows that infection had been present in both bulls. Hematogenous origin of the infection is always possible even in the adult. On the other hand, while there is no convincing evidence to support it, urethral infection from serving diseased cows is very probable.

BIBLIOGRAPHY

1. CARPENTER, C. M., Professor of Bacteriology, New York State Veterinary College, Cornell University.
2. BANG, B. Die Ätiologie des seuchhaften (infectiösen) Verwerfens. Zeit. Thiermed., Band I, S. 241, 1897.
Das Seuchenhafte Verwerfen der Rinder. Arch. Wiss. u. Prakt. Thierheilk., Band 33, S. 312, 1907.
3. Report of English Commission on Epizootic Abortion, Appendix to Part I, p. 17, 1909.
4. HADLEY, F. B., and LOTHE, H. The Bull as a Disseminator of

- Contagious Abortion. Jour. Amer. Vet. Med. Assoc., vol. 50, 1916-17, p. 143.
5. BUCK, J. M., CREECH, G. T., and LADSON, H. H. Bacterium Abortus Infection of Bulls (Preliminary Report). Jour. Agr. Research, August, 1919.
 6. SCHROEDER, E. C., and COTTON, W. E. The Bull as a Factor in Abortion Disease.
 7. MCFADYEAN, SHEATHER and MINETT. Researches Regarding Epizootic Abortion. Jour. Compar. Path. and Ther., vol. 26, p. 142, 1913.
 8. HADLEY, F. B. Contagious Abortion Questions Answered. Wis. Agr. Exp. Sta. Bul. 296, Sept., 1918.
 9. WILLIAMS, W. W. Technique of Collecting Semen for Laboratory Examination with a Review of Several Diseased Bulls. Cornell Veterinarian, vol. 10, No. 2.
 10. WILLIAMS, W. L. The Diseases of Bulls. Cornell Veterinarian, vol. 10, No. 2.
 11. WILLIAMS, W. W. Diseases of the Bull Interfering With Reproduction. Jour. Amer. Vet. Med. Assoc., vol. 2 (n. s.), No. 1.
 12. WILLIAMS, W. L. Report of New York State Veterinary College, Cornell University, 1919-20.
 13. ELLENBERGER. Vergl. Mikroskop. Anatomie der Haustiere, vol. 2.

VETERINARY PRACTICE IN ST. KITTS

Dr. Ernest F. Jardine, Government Veterinary Surgeon for St. Kitts, British West Indies, in sending in his application for membership in the A. V. M. A., sends the following brief but interesting description of his environment and work:

St. Kitts is an area of about sixty-eight square miles, has a population of 25,000, chiefly black. It is a mountainous island, the tallest mountains being from 3,000 to 4,500 feet high. There is only one road, practically speaking, and that one leads around the island, so if you start at a given point and keep going you will reach the place from which you started.

The island is very healthy, and, many of us think, very pretty, having the high mountains with green verdure in the centre, and the sea always in view.

I have a contract with most of the estates on the island to do the veterinary work at so much per quarter. They pay according to the number of animals kept, irrespective of the distance. An estate one mile from town may pay three times as much as one fifteen miles away. That being the case, I leave colic draughts for emergency cases. In the contract everything is included from castrating madam's tom cat to any major operation on the most valuable animal on the place. The amount of work I have to do would be worth twice as much in a big country, but living and house rent and one or two other items are much cheaper; the one counterbalances the other.

SOME STUDIES IN SWINE ABORTION¹

By FRED HAYES

University of California, Davis, Calif.

THE MATERIAL presented in this paper is the result of about a year's investigational work on swine abortion. In May, 1920, Hayes and Traum reported the results of some preliminary investigations made in three outbreaks of swine abortion in California caused by *Bacterium abortus* (Bang). No cultural, morphologic or biologic difference could be noted between the isolated swine strains and those from cattle, except that the porcine strains grew more abundantly and did not seem to develop such a deep brown pigment as did the bovine strains. This difference, however, was not constant. Since writing the above-mentioned report, absorption tests with rabbit sera immunized against three hog strains from our three different outbreaks, rabbit sera immunized against two bovine strains, guinea-pig serum immunized against one bovine strain, and serum from a naturally infected cow have shown no difference between the organism of bovine origin and those in swine. Porcine strains proved, on the whole, to be more virulent for guinea-pigs, causing, with a few exceptions, involvement of the testes and one or both radiocarpal regions, also general adenitis. Thirteen of 22 guinea-pigs inoculated with porcine strains succumbed within two months, while none of the 12 inoculated with bovine strain died of infection during that period. The dose for each guinea-pig in the above series was similar.

Before publishing our findings a search was made through the index pages of publications in which the etiology of abortion in swine would be discussed. This revealed to us reference to but one report in which *Bacterium abortus* (Bang) had been incriminated as the cause of a natural outbreak of this disease. This reference called attention to the work of Good and Smith, wherein they described an extensive outbreak of swine abortion in Kentucky caused by *Bacterium abortus* (Bang). Traum in 1914 had isolated *Bacterium abortus* (Bang) from the liver, stomach contents and kidney of an aborted fetus from a herd of swine in which many abortions had occurred. No exact history

¹ Presented at the fifty-eighth annual meeting of the American Veterinary Medical Association, Denver, Colo., September 5-9, 1921.

was obtained or further work done in this herd. Later (1919) Connaway, Durant and Newman of Missouri produced abortion in pregnant sows by artificial infection with *Bacterium abortus* (Bang) of bovine origin. Doyle and Spray reported in August, 1920, the isolation of an organism indistinguishable from *Bacterium abortus* (Bang) from a number of outbreaks of swine abortion in Indiana. The report of the Committee on Diseases of the United States Live Stock Sanitary Association for 1920 makes reference to the work of Schlegel in Germany wherein *Bacterium abortus* (Bang) was found to be the cause of certain outbreaks of swine abortion. Other investigations with this organism in relation to abortion in swine are known to be in progress at the present time. These reports, combined with the clinical observation of abortion in swine for many years, indicate increasing evidence that the abortion bacterium is of greater significance in this species than has been generally recognized. The fact that hogs have for many years consumed uncooked dairy products and associated with infected cattle giving off virulent abortion organisms, without serious epidemics of swine abortion developing until recently, is not to be considered lightly in the future if the maximum fertility of breeding stock is to be maintained.

Our principal investigations have been carried on in one herd of swine naturally infected with *Bacterium abortus* (Bang) and with a small herd artificially infected. The results of the experiments herein reported and the interpretations placed upon them can only be suggestive. However, they may be of value as data are accumulated.

VIRULENCE OF ISOLATED PORCINE STRAINS

In the three infected herds reported in a preliminary paper *Bacterium abortus* (Bang) was so abundant in the fetuses, fetal fluids and fetal membranes, and so easily cultivated, that little doubt was entertained as to its etiological importance. To test the power of the strains obtained from the three outbreaks to produce abortion, six first-time pregnant Duroc sows, negative to the agglutination test, were given emulsions of 48-hour-old cultures of our porcine strains. Three of these sows each received 1.5 mls of a heavy emulsion intravenously. The other three each received 10 mls of one of the organisms in their

mash twice a day for two consecutive days. Weekly agglutination tests were performed until the subsequent farrowing.

Sow No. 1119 was fed culture 1 (7) in the manner stated above. Complete agglutination of bovine and swine antigens with 0.02 c.c. serum occurred on the thirteenth day after feeding. The agglutinating titer of her serum never went appreciably higher than this, and she farrowed ten live but weak looking pigs 83 days after being fed. *Bacterium abortus* (Bang) was isolated from the fetal membranes and from the stomach contents of one of the pigs which was killed immediately after birth.

Sow No. 1124, fed in a similar manner with culture 3 (2), agglutinated bovine and swine antigens in 0.01 c.c. of serum on the twenty-first day after feeding, and the titer remained at this point for 53 days longer. Her serum then became negative in 0.02 c.c., and she farrowed nine healthy looking pigs 89 days after feeding the culture. Agglutination remained negative in 0.02 c.c. for about ten months more, at which time she again farrowed nine live pigs. *Bacterium abortus* (Bang) was isolated from the fetal membranes at first farrowing but not at the second.

Sow No. 1127, fed in a similar manner with culture 1 (1), agglutinated bovine and swine antigens with 0.01 c.c. of serum on the twenty-first day after feeding, and the titer remained at this point for 28 days longer. Agglutination then became complete with 0.002 c. c. for 21 days more, at which time she farrowed ten normal appearing pigs. On the day she farrowed her blood serum agglutinated in 0.005 c.c., but returned to positive in 0.002 c.c. in a week and remained at this point for eight months longer. This sow later farrowed eight live pigs and one dead one. *Bacterium abortus* (Bang) was not isolated from the fetal tissues at either farrowing.

Sow No. 1118 received 1.5 c.c. of a heavy emulsion of 48-hour porcine strain culture 1 (7) intravenously. On the eighth day after injection her blood serum gave complete agglutination with 0.002 c.c. On the twenty-seventh day after injection she aborted fetuses in about the sixth week of pregnancy. *Bacterium abortus* (Bang) was readily isolated from the fetal membranes and stomach contents of a fetus. For about two months after the abortion her blood continued to give complete agglutination with 0.002 c.c. During the next nine months she was positive in 0.02 c.c. but not in smaller quantities. This sow farrowed

ten live but weak pigs and one dead pig practically seven months after the abortion. *Bacterium abortus* (Bang) was obtained from the stomach contents of the dead pig. Six months later she again farrowed seven live weak and four dead pigs.

Sow No. 1126 received an intravenous injection of porcine culture 1 (1). On the eighth day her blood serum gave complete agglutination with 0.002 c.c. The agglutinating titer remained at least this high for thirteen months against both bovine and swine antigens. Twenty-five days after the injection she farrowed eight live normal pigs. *Bacterium abortus* (Bang) was obtained from the fetal membranes and the stomach contents of one of this litter killed before suckling. Seven months after the injection she again farrowed five normal live pigs and six months later she gave birth to nine live normal progeny.

Sow No. 1121, supposed to have been pregnant when purchased for the infection experiment, proved not to be so, but received an intravenous injection of culture 3 (2). She was bred three months after the injection. Her blood serum agglutinated bovine and porcine strains with 0.002 c.c. on the eighth day. This power was maintained for a little more than six months, and at the seventh month after injection she farrowed nine live pigs and one dead pig. Three weeks later posterior paresis and a vaginal discharge developed, from which she improved slowly during the next two months. When able to walk alone, though with difficulty, she was bred. A month later she was butchered and found to be pregnant. There was no visual evidence of infection in the pregnant womb. *Bacterium abortus* (Bang) was not isolated.

A review of this experiment in infection with *Bacterium abortus* (Bang) indicates that actual abortion is produced with difficulty by artificial infection. Sow No. 1118, injected intravenously, gave a rather classical result by aborting in 27 days. The effect of feeding and injection upon the other five sows, however, was benign, notwithstanding evident implantation of the infection. Their breeding qualities were not materially lessened, although a few of the pigs were born weak and did not long survive.

Some strains of *Bacterium abortus* (Bang) are known to lose their virulence under laboratory cultivation while maintaining their biological ability to produce agglutinins. The cultures used in these experiments were isolated from virulent natural

outbreaks and had not been under laboratory cultivation for more than a month. In five of the six sows infection became established as indicated by the production of agglutinins and by the recovery of *Bacterium abortus* (Bang) from the fetal tissues.

In these artificial infection experiments just described, and also in an experiment with eight young boars and barrows fed or injected with mixed strains of porcine abortion cultures, antibodies appeared in 0.002 c.c. of serum in about eight days in those injected, and in from 21 to 30 days in those fed with cultures.

There apparently are some contributing factors in field infection that do not occur in artificial attempts to produce abortion with *Bacterium abortus* (Bang).

AGGLUTINATION REACTIONS IN NATURALLY INFECTED HERDS

In March, 1920, monthly agglutination tests were begun in a naturally infected herd (Herd 2) of 60 purebred swine in which six abortions had occurred between February 8 and March 2, 1920. Quantities of 0.02, 0.01, 0.005 and 0.002 c.c. of the serum to be tested were added to 1 c.c. of the antigen. Both porcine and bovine antigens were used in every test. This was the regular routine, although higher dilutions were frequently made. Whenever complete agglutination occurred with 0.01 c.c. of serum the hog was designated as a positive.

On the first test there were 29 positive, including the 6 aborters, and 31 negative. One month later 6 had changed from negative to positive and 3 from positive to negative, although these new negative sows did not continue to be negative throughout the year.

A study of these agglutination test records for the year shows that practically all of the reactors continued to agglutinate in amounts of serum from 0.02 to 0.005 c.c. for the entire time, and that only 11 animals out of the 48 tested monthly throughout one year remained consistently negative. It is difficult to analyze the agglutination records for interpretation and to account for fluctuations that were obtained in the titer of serum from some of the hogs at different times. The majority of the monthly results, however, were very consistent throughout the year. At the end of the year there appears to be the beginning of a fall in the agglutinating titer in the animals that were regularly positive during this period. Pregnancy and the farrowing act do not

seem to alter consistently the quantity of agglutinins in the blood serum.

AGGLUTINATION TESTS AND INFECTION IN PIGS

It has been of interest to observe whether agglutinins are transmitted from positive mothers to their offspring at birth, and also to note whether agglutination will occur in pigs nursing infected mothers. We have not found agglutinins present in new-born pigs, but only a small number have been tested. A total of 116 pigs have been tested at weaning time. Of this number 73 were from positive reacting mothers and 43 from negative mothers, and *Bacterium abortus* (Bang) was isolated from 8 sows out of the 19 giving birth to the 116 pigs. All of these weanlings gave negative reactions. Eighteen of them, all from artificially infected mothers, were placed in a noninfected environment and their blood serum tested again when they were 3, 5 and 7 months of age. They were still negative to the test. Thirty-four (from 8 different mothers—6 positive and 2 negative to the agglutination test) were left in an infected environment and were tested again when they were six months of age. Seventeen reacted positively and 17 negatively.

It appears from this limited observation that neither agglutinins nor *virulent* abortion organisms are transmitted to the offspring at birth or while suckling. It is suggested that a new, and not a latent, infection was responsible for the appearance of antibodies in these 17 shoats left in an infected environment.

BREEDING QUALITIES AS AFFECTED BY BACTERIUM ABORTUS (BANG)

The breeding records of eight sows out of eleven known aborters in two herds are available for study in Table 1.

With the exception of sow No. 1118, all of these aborters were in two herds in which the infection suddenly developed during February, 1920, and as suddenly disappeared so far as actual abortions were concerned. No treatment was instituted in these herds except quasi isolation of the aborting sows for the period of any genital discharge. Of the 8 that were retained for breeding, 6 bred and farrowed normally the following fall. One was difficult to get in pig and farrowed 7 live pigs and 1 dead one 13 months after the abortion. The other sow (No. 1118) bred at her regular time but farrowed 1 dead pig in a litter of 11.

TABLE 1.—BREEDING RECORD OF SOWS SUBSEQUENT TO ABORTION (AUG. 20, 1921)

Sow No.	Date of Abortion	Date Farrowed	Remarks
17, Herd 2	Feb. 6, 1920 (77 days)	Following fall and spring litters normal.	No history since.
8, Herd 2	Feb. 8, 1920 (70 days) First litter	.....	Sold March 10, 1921.
6, Herd 2	Feb. 14, 1920 (97 days) Second litter	March 15, 1921 (7 live, 1 dead).	Difficult to get with pig.
33, Herd 1	Feb. 14, 1921 (67 days)	Had normal fall litter (No.?).	No history since.
10, Herd 2	Feb. 15, 1920 (94 days) Second litter	.....	Sold March 10, 1921.
46, Herd 2	Feb. 17, 1920 (94 days) First litter	Oct. 6, 1920 (6 normal). March 29, 1921 (3 normal).	
20, Herd 1	Feb. 17, 1920 (72 days)	Had normal fall litter (No.?).	No history since.
20, Herd 2	Feb. 21, 1920 (47 days)	August 30, 1920 (12 normal). April 15, 1921 (9 normal).	Posterior paresis for three weeks during April, 1920. Recovered.
21, Herd 1	Feb. 23, 1920.	Following fall and spring litters normal.	No history since.
27, Herd 2	Mar. 2, 1920 (108 days)	.....	Posterior paresis, April, 1920. Died May 16, 1921.
1118, Exp.	April 19, 1920 (42 days)	Oct. 10, 1920 (10 live, 1 dead). April 6, 1921 (7 live, 4 dead).	Artificially infected sow. Infected March 18, 1920 (intra).

Observations have also been made upon the breeding records of sows in an infected herd in which regular agglutination tests have been made. In Table 2 a record is given of the breeding history of sows whose sera showed an agglutinating titer of at least 0.01 c.c. against both bovine and porcine antigens throughout the year. Table 3 records similar observations upon sows whose sera failed throughout the year to agglutinate bovine and porcine antigens in 0.02 c.c. or less.

A review of Table 2 shows that the 26 positive sows farrowed 276 live and 24 dead pigs during the year. Two became sterile. Ten farrowed no dead pigs and 16 gave birth to one or more dead pigs. In this record are 11 gilts that were positive to the agglutination test from 6 months to a year before farrowing. Five of these (Nos. 35, 68, 75, 51, 60) farrowed from 1 to 4 dead pigs. *Bacterium abortus* (Bang) was isolated from only 1 gilt (No. 68) at birth of pigs. From the 6 that farrowed no dead pigs, *Bacterium abortus* (Bang) was isolated from 4 (Nos. 9, 66, 73, 50). Of course *Bacterium abortus* (Bang) might have been present in more of the sows in either group, but it was not found. At least 2 of the sows (Nos. 28 and 42) discharged *Bacterium abortus* (Bang) at both the first and second litters during the year.

TABLE 2.—BREEDING RECORD OF SOWS SHOWING AGGLUTINATION AGAINST BOVINE PORCINE ANTIGENS

Sow No.	Date of Farrowing	Number of Pigs Farrowed		Remarks
		Live	Dead	
9	Apr. 12, 1920	7	0	First and second litters.
	Apr. 3, 1921 ¹	10	0	
28	Mar. 10, 1920	9	1	Had 3 previous normal litters.
	Sept. 8, 1920 ¹	10	1	
35	Mar. 20, 1920	3	4	First litter.
42	Aug. 17, 1920 ¹	9	0	Had 1 previous litter.
	Mar. 13, 1921 ¹	11	1	
45	Oct. 4, 1920	10	0	Bred several times between Nov., 1919, and June, 1920. Had vaginal discharge Mar., 1920.
	Mar. 31, 1921	7	0	Bred several times for this litter. Had 4 previous litters.
49	Oct. 16, 1920 ¹	7	3	
52	Sept. 12, 1920 ¹	6	3	
	Mar. 4, 1921 ¹	12	0	
54	Sept. 5, 1920 ¹	6	3	Had 4 previous litters.
	Mar. 4, 1921 ¹	12	0	
55	Mar. 5, 1920	3	0	First and second litters.
	Apr. 8, 1920	9	0	
56	Sept. 8, 1920	11	0	First and second litters.
	Mar. 17, 1921	8	0	
66	Mar. 12, 1921 ¹	8	0	Gilt first litter. Positive for year before farrowing.
68	Mar. 10, 1921 ¹	4	1	do.
71	Mar. 23, 1921	3	0	do.
73	Mar. 8, 1921 ¹	4	0	do.
75	Mar. 17, 1921	9	1	do.
31	Mar. 28, 1920	11	2	Had vaginal discharge following first litter. Recovered and bred Nov. 11, 1920, for last litter.
	Mar. 6, 1921 ¹	9	1	
40	.....	.....	.....	Sterile. Chronic endometritis found upon autopsy. Had 8 dead pigs Nov., 1919.
43	Sept. 5, 1920	7	3	Sold. Not in pig April, 1921.
44	.....	..	..	Sterile. Estrum absent. Had had 5 litters.
50	Aug. 12, 1920 ¹	4	0	Gilt first litter. Positive 5 months before farrowing.
51	June 7, 1920	10	1	Gilt first litter. Positive 3 months before farrowing.
60	Mar. 17, 1921	10	1	Gilt first litter. Positive 11 months before farrowing. Had vaginal discharge before breeding.
61	Mar. 19 1921	8	0	Gilt first litter. Positive for 9 months before farrowing.
65	Sept. 1, 1921	3	0	Gilt first litter. Positive for 5 months before farrowing.
1126	Apr. 12, 1920 ¹	8	0	Sow intravenously infected Mar. 19, 1920
	Oct. 18, 1920	5	0	
	Apr. 21, 1921	9	0	
1127	May 27, 1920	10	0	Sow fed cultures Mar. 18 and 19, 1920.
	Jan. 10, 1921	8	1	

¹ *Bacterium abortus* (Bang) isolated from either the placenta, organs of dead pigs, or vaginal swabs.

TABLE 3.—BREEDING RECORD OF SOWS FAILING TO AGGLUTINATE AGAINST BOVINE AND PORCINE ANTIGENS

Sow No.	Date of Farrowing	Number of Pigs Farrowed		Remarks
		Live	Dead	
32	Apr. 16, 1920	6	2	Had 1 previous litter.
	Sept. 28, 1920	12	1	
	Apr. 5, 1921	4	3	
37	Mar. 28, 1920	8	5	First, second and third litters.
	Oct. 7, 1920	11	0	
	Mar. 29, 1921	3	1	
69	Mar. 7, 1921	8	0	First litter
41	Apr. 16, 1920	13	0	Feb. 21, 1919—farrowed 8 dead pigs.
	Oct. 8, 1921	12	0	
	Apr. 1, 1921	10	1	
53	Mar. 8, 1920 ¹	4	10	Had 2 previous normal litters.
	Oct. 7, 1920	8	3	

¹ *Bacterium abortus* (Bang) isolated from placenta.

In Table 3, five negative sows farrowed 99 live and 26 dead pigs during the year. *Bacterium abortus* (Bang) was isolated from the placenta of only one (No. 53) of these negative sows, although dead pigs appeared in some of the different litters of all of the sows except one. In fact the negative sows farrowed a higher percentage of dead pigs than did the positive sows.

These results seem to suggest that in the case of young gilts infection as indicated by a positive agglutination reaction does not indicate disaster at the first pregnancy to any greater extent than in sows that have had previous litters; that sows may harbor the organisms in the tissues and eliminate them through the genital organs at a normal farrowing; and that some infected sows fail to produce agglutinins to any diagnostic extent.

TRANSMISSION OF INFECTION BY COPULATION

Naturally the question of the transmission of *Bacterium abortus* (Bang) by breeding infected boars to noninfected sows and noninfected boars to infected sows is as important as this breeding problem is in bovine abortion. If the results of experiments in swine are applicable to cattle we should have data in the near future that will aid in drawing some positive conclusions upon this question, as well as upon several others concerning which a difference of opinion exists. Some preliminary experiments have been made during the past year in an attempt to throw light upon this phase of the abortion problem.

Ten young boars, which were the offspring of the sows used in the artificial infection experiment referred to earlier in this paper, were utilized in one experiment in an effort to isolate *Bacterium abortus* (Bang) from the testicular tissues. It will be recalled that these sows gave positive agglutination reactions at the birth and during the suckling period of the pigs. The boars had been kept in a noninfected environment and remained negative to test until they were 6 to 8 months old. At this time 8 were injected intravenously and 2 subcutaneously with 2 mls of a saline emulsion of 48-hour-old cultures of three strains of porcine *Bacterium abortus* (Bang). Eight days after the injection 8 of these boars were positive to the agglutination test in 0.002 c.c. One injected intravenously was positive to 0.01 c.c., and the other, injected subcutaneously, showed no antibodies in 0.02 c.c. Fourteen days after the injection 9 were castrated (one having been retained as an infected breeding

boar 1, and 2 c.c. of a saline emulsion of the testicle and epididymis of each was injected into two guinea-pigs. The guinea-pigs remained well and produced no agglutinins to *Bacterium abortus* (Bang) during the next 30 days.

A similar experiment was tried with 7 young boars from the same source and negative to the agglutination test since birth. These were fed 10 mls of a 48-hour-old mixed culture of porcine strains twice a day for 6 days. No great amount of infection could be demonstrated by the presence of agglutinins. In about 30 days the blood of 4 of these boars agglutinated in only 0.02 to 0.01 c.c., and 3 of them showed no agglutinins in 0.02 c.c. Fifty-four days after feeding the cultures all 7 were castrated. Guinea-pigs inoculated with the testicular tissue gave negative results for *Bacterium abortus* (Bang).

Observations relative to the transmission of abortion infection by positive boars and the infection of boars by positive sows under natural field conditions are difficult to interpret and are not extensive in our experience. In the experimental herd in which natural infection was recognized during February, 1920, there are three herd boars that have been negative to the agglutination test throughout the year, notwithstanding the fact that they have served a number of positive sows during this period.

With reference to transmission of the infection by the positive boar, our observations are confined to two cases, and these are not yet conclusive. An aged Duroc boar that became naturally infected over a year ago was bred in March, 1921, to a negative gilt. This gilt had been negative to the test since birth, although born of an infected sow, and she had been kept in noninfected pens. On July 18 she farrowed one live and four dead pigs. During pregnancy and up to one day after farrowing there were no agglutinins. *Bacterium abortus* (Bang) was not isolated, but from the thoracic fluid of one of the dead pigs a Gram-negative gas-producing organism not yet identified was obtained.

Another gilt (No. 650) with history practically identical to the one just described was also bred to this infected boar. She remained negative during pregnancy and farrowed August 18, 1921, 9 normal pigs. A small macerated fetus about 7.5 cm. in length was found shed with the afterbirth. Cultures have not yet been identified. It may be added that the infected boar bred to these gilts has since been castrated. Guinea-pig inocu-

lations of his testicular tissue proved negative for *Bacterium abortus* (Bang).

LOCALIZATION OF BACTERIUM ABORTUS (BANG) IN TISSUES OF INFECTED SWINE

In attempts to locate *Bacterium abortus* (Bang) in the tissues other than testicular, we have data on a few hogs with different histories of infection. In the young boar infection feeding experiment mentioned above there were included two negative barrows (Nos. 602 and 603) which were also fed cultures of *Bacterium abortus* (Bang). Agglutinins appeared in 0.02 c.c. in about 30 days, and in 3 months after having been fed the culture emulsions the barrows were butchered. Guinea-pigs were each injected subcutaneously with 2 mls of a saline emulsion of the kidney, spleen, liver and thyroid and 2 mls of urine from barrow No. 602. Similar injections, with the addition of scrapings from the urethral mucosa, were made into guinea-pigs from the tissues of barrow No. 703. The results of this experiment are not complete, because the guinea-pigs injected with liver, kidney and spleen tissue from barrow No. 603 and with kidney and spleen from barrow No. 602 died with no characteristic lesions in from 3 to 7 days after injection. No agglutinins could be demonstrated from these injections, and *Bacterium abortus* (Bang) was not isolated after death. Negative results were also obtained in guinea-pig inoculations of emulsions of spleen, liver, brain, ovaries, kidney, lumbar glands and amniotic fluid from a sow (No. 1121) intravenously infected on March 18, 1920, and from which *Bacterium abortus* (Bang) was isolated from a dead fetus farrowed in a litter on October 2, 1920.

In only one case have we been able to isolate *Bacterium abortus* (Bang) outside of the genital tract and ovaries. This was from the mammary gland of sow No. 1119, artificially infected by feeding live cultures of porcine origin on March 18 and 19, 1920. On September 19, 1920, she died, apparently from heat stroke. A section of mammary gland was triturated in saline solution and 2 mls injected subcutaneously into two guinea-pigs. In 9 days the sera of the pigs were positive for *Bacterium abortus* (Bang) and the organism was recovered from the spleen and liver.

We have frequently isolated the organism from fetuses and

placenta and in 2 sows from vaginal discharge 11 and 24 days respectively after abortion.

EFFECT OF CASTRATION OF BOARS UPON THE AGGLUTINATING TITER

The habitat of *Bacterium abortus* (Bang) in the tissues of swine, especially in boars and barrows, has not yet been conclusively demonstrated. We have been unable in a limited amount of work to isolate *Bacterium abortus* (Bang) from the testicles or other tissues of infected males. Since we believe agglutinins are the product of persistent stimuli of infecting organisms, it seems logical to expect the titer of a positive serum to recede after removal of the tissue (testicle) commonly supposed to support the infection. In four artificially infected young boars that were positive in from 0.002 to 0.005 c.c. of serum at time of castration the titer was not affected up to one month after castration. In one aged, naturally infected boar (No. 82) the titer dropped from positive in 0.005 to positive in 0.01 c.c. in a month.

OTHER ORGANISMS AS A POSSIBLE CAUSE OF SWINE ABORTION

Since our first report of the three California outbreaks in February, 1920, two others have been investigated. In one of the herds *Bacterium abortus* (Bang) was isolated and in the other a nonmotile *Bacillus coli communior* developed in every instance from culture inoculations made from material secured from a sow that aborted. The inoculations were made from vaginal discharge before abortion, from stomach contents and liver of aborted fetuses, and from two partially mummified fetuses. In this herd three sows dropped dead pigs prematurely, six farrowed dead pigs in a portion of their litters, and two went beyond the completion of the gestation period and presumably lost their pigs in the pasture. The sow from which the inoculations were made showed a vaginal discharge several days before abortion, and the attending veterinarian considered the appearance of the aborted fetuses entirely different from others in this outbreak. In the previous cases in this outbreak the aborted fetuses showed a marked sanguinoseo-gelatinous infiltration that was absent in these fetuses. Agglutination tests with bovine and porcine strains of *Bacterium abortus* (Bang) yielded 7 negative cases. The serum from one boar was posi-

tive in 0.04 c.e. The serum from the first sow to abort caused agglutination in 0.02 c.e. and was positive to the complement-fixation test. The serum from the last sow to abort and which yielded *Bacillus coli communior* was positive in 0.02 c.e. and minus-plus in 0.01 c.e.

Zeh in Germany reported in 1920 the isolation of a bacillus belonging to the paratyphoid-Gärtner group from the organs and body fluids of fetuses which were aborted in the twelfth week of pregnancy. He obtained a similar organism from all the organs of a pig (on another farm) which died one day after farrowing. He also reports similar findings from two fetuses from still another farm.

SUMMARY AND CONCLUSIONS

From the numerous reports of abortion in swine and the frequency with which *Bacterium abortus* (Bang) has been isolated from these outbreaks during the last few years, it appears that we are now confronted with a disease in swine whose importance has been generally underestimated.

It is natural to assume that this infection in hogs is derived from cattle and probably by ingestion of retained afterbirth, aborted fetuses, discharges and milk naturally infected with *Bacterium abortus* (Bang). In our cases there was no direct evidence of infection from cattle, but the possibility of such infection could not be entirely eliminated.

The virulence of porcine *Bacterium abortus* (Bang) as measured by its ability to induce abortions is not pronounced. Only one of these strains isolated from virulent outbreaks in California produced abortion in an experiment including six sows. This abortion was produced by intravenous inoculation. Feeding suspensions of the live cultures caused no abortions in this series, but the organisms found their way to the pregnant womb and were isolated at normal birth of pigs.

Agglutinins appear in the blood of swine injected subcutaneously or intravenously in about 7 days, and in from 21 to 30 days in those fed live cultures.

Natural infection in young gilts 5 to 12 months previous to farrowing does not seem to portend trouble during the first pregnancy to any greater degree than in sows having had previous litters. Positive reacting sows containing *Bacterium abortus* (Bang) in placental tissues may farrow normal litters,

and negative reacting sows may farrow dead pigs. Agglutination by the blood serum therefore is no indication of the outcome of pregnancy.

Vaginal swabs made from two positive sows indicated that *Bacterium abortus* (Bang) may be present in vaginal discharges from 11 to 24 days after farrowing.

There is favorable evidence that infected sows may retain the organisms in the tissues and eliminate them at the termination of succeeding normal or abnormal pregnancies.

Sterility has not been a serious sequela of abortion infection in the herds under our observation.

Agglutinins apparently are not transmitted in utero and were not present in the blood of 116 pigs tested at weaning time. Neither did they appear in 18 of the same pigs kept in non-infected environment up to 7 months of age. On the other hand, 17 out of 34 of those kept in an infected herd reacted to the agglutination test when 6 months of age.

Attempts to isolate *Bacterium abortus* (Bang) from the testicular tissues of 17 boars artificially injected and 1 boar naturally infected with *Bacterium abortus* (Bang) were unsuccessful. Negative results were also secured in locating the organisms in the kidneys, spleen, liver, thyroid and urethra in 2 positive barrows. In 1 sow artificially infected by intravenous injection, *Bacterium abortus* (Bang) was isolated from the udder 6 months after contact with organisms and 3 months after farrowing normally.

Castration of infected positive boars did not materially alter the agglutinating titer of their serum up to 30 days after castration.

ACKNOWLEDGMENT

The writer desires to express his appreciation for the valuable support given to him and to this work by Dr. C. M. Haring, and especially to acknowledge the many helpful suggestions received from Dr. J. Traum, also to record his appreciation for the thorough cooperation, through Prof. E. H. Hughes, of the Division of Animal Industry.

DISCUSSION.

DR. CONNAWAY: Mr. Chairman and fellow members, Dr. Hayes gave me a copy of his paper to look over, as I had been assigned the duty of opening the discussion. At the outset I wish to express my unstinted admiration for the good work which Dr. Hayes and his colleagues, Drs. Traum and Phipps, have done; and especially so as

the results are closely in accord with those which I and my research associates, Durant and Newman, have obtained, and which in part were reported at the meeting last year at Columbus, Ohio.

I have all the more confidence in the results which have been reported by Dr. Hayes, and in our own work, because the similar results have been obtained independently at widely separated experiment stations, and by the use of different diagnostic tests or checks in the investigational work. At the California station the "agglutination method" was almost exclusively employed, as indicated by the paper just read; while we at the Missouri station used the "complement fixation" method almost exclusively, although some phases of the work were checked by the agglutination method.

The work carried on at the two stations illustrates aptly the importance of different workers conducting investigations upon the same problem independently and concurrently. Accurate and conclusive results are thus more likely to be obtained, and more quickly. There will be agreement on most of the findings concerning facts and interpretations; and by conference and presentation of results, at meetings like this, the points of difference can be brought out, and each investigator can set himself anew to the work of harmonizing the differences in experimental findings and interpretations, by the addition of fuller data, or the correction of errors in previous work.

While the results which Dr. Hayes and his co-workers have obtained are in the main in accord with those which I and my research associates have found, there are a few points upon which we are not in agreement, but I am sure that further work will bring us into full accord on all essential points. The fundamental points upon which we now agree are these—that a specific infectious abortion disease exists among swine, and that the specific cause is the *Bacterium abortus* (Bang), or an organism very closely related to this microbe.

Before the comparatively recent work of these two stations, which was begun as emergency investigations of serious outbreaks of abortion in purebred herds of swine in the two States, the Bang abortion organism, as referred to by Dr. Hayes, had previously been isolated from aborted fetuses of swine in two instances, and its probable causative relation pointed out, first by Dr. J. Traum, who in 1914 isolated the organism from a swine fetus which had been sent for diagnosis to the pathological laboratory of the U. S. Bureau of Animal Industry. But beyond the laboratory cultural tests no further investigation of the organism seems to have been carried out at that time; and, unfortunately, the brief mention of the work, in the annual report of the department, was put under a heading relating to another swine ailment, and was not properly indexed. It was overlooked by subsequent investigators until attention was called to the matter recently by Dr. Traum. The discovery of the same organism by Professors Good and Smith, of the Kentucky Agricultural Experiment Station, in 1916, in an aborted swine fetus was entirely independent of previous work. These investigators, moreover, tested the pathogenicity of the organism for pregnant swine and thus added more conclusive evidence as to its causative relation to infectious abortion in swine. These conclusions the California and Missouri Experiment stations have more fully confirmed by their more extensive work, and by more rigid experimental tests. These stations, moreover, have added new facts of value concerning this disease in swine, and its relation to the infection in cattle.

It will not be necessary to dwell at length upon the points upon which we are all in close agreement, but simply to mention the more important ones in passing.

Concerning the cause, no one will claim that all abortions in swine are due to the *Bacterium abortus* (Bang). But I desire to emphasize

the opinion that the great majority of swine abortions, and especially those of an apparently infectious character, are due to this organism. Our own experimental studies, and numerous diagnostic tests of blood samples from suspected herds, confirm me in this opinion.

On the questions of sources of infection and modes of transmission in swine, I think we can safely regard the causative organism as an obligatory microbe which does not propagate outside the animal body under natural conditions, but requires special animal tissues for its perpetuation. The naturally infected tissues and fluids as pointed out in the paper of Dr. Hayes, are the aborted fetuses, the fetal membranes, the uterine discharges and the mammary gland, from all of which he has isolated the organism just as we have done in our work, with the exception that we did not attempt to isolate the organism from an emulsion of the mammary gland tissue of reacting sows. But we have made it a routine practice to investigate the colostral milk of aborting or reacting sows on experiment, and to inoculate guinea-pigs with the milk samples, and test the colostral serum for the specific abortion antibodies. The proof that the udder of abortion-infected swine harbors and discharges the *Bacterium abortus* (Bang) is thus easily demonstrated.

As to the modes of transmission under natural conditions, an important observation has been made both at the California and the Missouri experiment stations, namely, that unbred gilts may become reactors to the agglutination or to the complement-fixation tests for abortion antibodies, while exposed to aborting sows. This points to ingestion of infected materials as probably the principal mode of infection. To this I am able to add the evidence of artificial feeding of *Bacterium abortus* cultures to a non-pregnant sow which was followed by the development of the specific serological reaction (complement fixation).

Dr. Hayes' paper does not indicate any attempt to infect swine by feeding naturally infected materials, and his feeding of laboratory cultures, while inducing the specific agglutinating antibodies in the blood, did not produce abortion in the few animals that were fed. On these points, however, we have been a little more fortunate in our experimental work. The feeding of aborted pigs and membranes to non-reacting pregnant sows developed the specific abortion antibodies and was followed by abortion, and the *Bacterium abortus* was recovered from the infected experiment animals. Similar results were also obtained from feeding laboratory cultures from bovine and from porcine sources to pregnant swine.

As to the persistent retention of infection in mature swine shown by the data presented, this accords with observations made in our work by monthly tests of sows which have been on experiment since the autumn of 1919. Some naturally infected sows, however, are variable in their reaction to the complement fixation test, as is also shown to be true by Dr. Hayes concerning the reaction to the agglutination test. In our work, moreover, a few sows seem to have completely eliminated the infection. But the indications are that, as a rule, the aborting sow retains the infection permanently and will react persistently.

Concerning the transmission of the specific antibodies to the young pigs in utero or through the milk after their birth, we had about come to the same conclusion expressed by Dr. Hayes that such transmission was not probable. The difficulty of obtaining blood from the young pigs led us to defer the blood test until near weaning time. And in every case the blood serum was negative to the complement fixation test, just as the seventy-three pigs of positive reacting mothers were negative to the agglutination test, as reported by Dr.

Hayes. But as our work at so many points showed the swine infection to be identical with the bovine infection, I was not satisfied until we had made a fuller study, by testing the blood of the suckling pigs earlier. I instructed my laboratory associates to kill a few new-born pigs, if necessary, before they had suckled and others after they had suckled and test the blood serum. Fortunately a better plan was found—that of drawing the blood from the heart of the new-born pigs with a fine needle. A sufficient quantity for the tests can thus be obtained without serious hurt to the young pigs. It was found that the blood serum of a few pigs will react before the pig has suckled its reacting dam, but a larger number are negative. In all cases, however, the antibodies are found in the blood soon after the pig has suckled; and a retest at intervals shows the reaction is retained from a few weeks to several weeks, but that ultimately the antibodies and presumably the infection also is eliminated. A study of the colostrum shows it to be rich in the abortion reacting bodies (agglutinins and complement-fixing bodies), as well as the *B. abortus* organism. The young pig, however, like the young calf, seems to be able to destroy the infection, and the antibodies, and does not become reinfected as a rule unless re-exposed to "open infection" after sexual maturity. This gives added evidence of the identity or close kinship of the infection in the bovine and porcine species.

In the matter of the relation of abortion infection in swine to sterility and other conditions that affect breeding efficiency, Dr. Hayes is somewhat optimistic because observations show that some aborting sows, and in fact a rather large percentage, will conceive again, and some will rear large litters in spite of the retention of the infection. I confess to having shared in this hopefulness, but the more we study this matter the more serious it appears. The fact that a sow will conceive again after aborting, and while still carrying infection, is not the whole story. We must take into consideration the delays that occur in getting the sows with pig again, and also the small size of the litters that are farrowed by many of the infected sows. A regrouping of the animals in Table 2 according to age will bring out this point better. The reacting sows, several in number, which farrowed only from three to four pigs, I would classify as aborters, that is, some of the products of conception did not come to maturity. The term "partial aborter" would probably be more appropriate. In other cases the retention of septic matters following an abortion may cause permanent injuries to one horn of the uterus and render that portion sterile, while the other horn may remain functional. A *partial sterility* may thus be induced and result in small litters. The herds which I have had under observation furnish similar data resulting from the hurtful action of the *Bacterium abortus*, and its secondary or associated infections.

I wish to consider only a point or two in Table No. 3. A group of non-reactors, some of which farrowed several dead pigs as well as living pigs, and from one of which the *Bacterium abortus* was isolated, while others in this group farrowed healthy good-sized litters. I would suggest that it is probable that the non-reactors which farrowed good litters were not infected, while the probabilities are that all the non-reactors which farrowed some dead and some living pigs were carriers of abortion infection, but that at the time the tests were made the antigenic action may have been very weak and agglutinins may not have been present in sufficient amount to show the reaction. I would suggest that the colostrum serum be tested at farrowing time, and also that the complement fixation test be applied in these doubtful cases.

The studies which Dr. Hayes has made to determine the susceptibility of the testicular glands to invasion by the *Bacterium abortus*,

following artificial infection with cultures, recalls a study we made on a bull and a steer which were inoculated at the same time with the bovine abortion organisms. My prejudgment of the matter was that the bull would probably show a more persistent reaction than the steer, but monthly tests for more than a year showed that the steer retained antigenic substances much longer than the bull; and the thought that the testicular substance furnishes an especially appropriate medium for the growth of the *Bacterium abortus* in the living host may not be tenable, although this organ has, in some cases, been the seat of lesions due to the abortion bacillus. Taking the negative results shown by Dr. Hayes' work on the young boars, with that which we have carried out on the bull and steer, we may tentatively conclude that the testicle in fact may produce internal secretions which are antagonistic to the *Bacterium abortus*. A definite conclusion upon this matter cannot, however, be drawn from the observations made on the few animals under experiment.

The *Bacterium abortus* infection in swine is in my opinion a serious menace to the breeding efficiency of a herd, even though it does not show in the form of total abortion, and we should strive in every way possible to eradicate it from the herds. In this conclusion I am sure that Dr. Hayes and his co-workers agree with me. And I feel also that every one here will agree with me that the work presented is ample evidence that Dr. Hayes and his co-workers have a good grasp of the problems under consideration, and we hope they will continue their investigations, and that every other worker in this field will do the same, as opportunities permit.

VETERINARY CHIROPRACTIC AGAIN

A Wisconsin physician reports the following incident to the *Journal of the American Medical Association*:

"A chiropractor was making regular calls at the home of a prosperous farmer to 'adjust' the farmer's wife. The farmer had a full-blood Holstein heifer fresh for the first time, and unfortunately the heifer gave milk from but two teats. To attend the heifer the farmer called a graduate veterinary surgeon, who had made two or three trips to the farm, but who had not succeeded in obtaining milk from the other two teats. The heifer was mentioned in presence of the chiropractor, who said, 'Let me see the heifer, I can fix her for you.' So, after adjusting the farmer's wife the chiropractor went to the barn, ran his fingers along the heifer's spine, and said, 'Here is the trouble, right here.' He secured a croquet ball and mallet, returned to the barn, placed the ball on the heifer's back and hit it with the mallet, assuring the farmer that the heifer would be all right now. The heifer never gave milk from the other two teats. The farmer tells the story, and thinks it a great joke that the chiropractor should attempt to adjust the heifer, but it has not yet dawned on the farmer that there is any joke in the chiropractor adjusting his wife."

THE OCCURRENCE OF VIRULENT AND NONVIRULENT STRAINS OF THE HEMORRHAGIC SEPTICEMIA ORGANISM IN THE SAME ANIMAL¹

By H. PRESTON HOSKINS

*Medical Research Laboratories, Parke, Davis & Company,
Detroit, Michigan*

THE latter part of January, 1921, an opportunity was afforded to observe and study an outbreak of hemorrhagic septicemia in cattle on a farm near Clinton, Michigan. The disease had made its appearance among three carloads of calves, recently shipped from the Chicago stockyards, and was of the usual pulmonary type (so-called "stockyards pneumonia") seen in recently shipped animals. Upon our arrival at the farm several calves were already dead, a number were quite sick, and more than half of the others were showing some symptoms. The history and symptoms were sufficient to establish a clinical diagnosis of hemorrhagic septicemia of the pulmonary type, and autopsies held on the dead calves served to confirm the diagnosis. Tissues were taken from one of these calves, and the bacteriological findings in these tissues serve as the basis for this report.

Upon returning to the laboratory it was decided to confine the bacteriological examination to the sections of lung and muscle. The lung showed the usual catarrhal pneumonia found in these cases, and the muscle showed some hemorrhagic infiltration. The latter condition is not constant in the pulmonary type of hemorrhagic septicemia, but is quite frequently seen in the acute, septicemic form. It was decided to make direct cultures from the lung and muscle, as well as animal inoculations. Cultures were made from the exudate expressed from the bronchioles in the pneumonic areas of the lung and from the freshly cut surface of the hemorrhagic muscle, both of which had been removed and kept as free of contaminations as possible. For the animal inoculations emulsions were made of the lung and muscle in sterile physiologic saline solution. The larger particles were allowed to settle, and the relatively clear, supernatant liquid used for the inoculations.

It may be stated here that our reasons for making both direct

¹ Presented at the fifty-eighth annual meeting of the American Veterinary Medical Association, Denver, Colo., September 5-9, 1921.

cultures and animal inoculations were based on some previous experiences in which it appeared that animal inoculations alone had given erroneous results. On other occasions direct cultures without animal inoculations had been unsatisfactory. About 18 months previously, in an investigation of a reported outbreak of hemorrhagic septicemia among swine, we had isolated *Bacterium suissepticum* directly from the tissues, although emulsions of the same tissues had failed to infect laboratory animals. In this instance we examined material from six hogs in one herd, and isolated strains of *Bacterium suissepticum* from five of the six. Of these five strains only three were virulent for rabbits, and of these three only one was virulent for pigeons.

It might rightfully be assumed that animal inoculations would give more accurate results than cultures, so far as determining the presence of virulent hemorrhagic septicemia organisms is concerned. *Bacterium bovissepticum* has the reputation of being a rather elusive organism when attempts are made to isolate it directly from pathological material, even heart-blood, in which the organisms are sometimes quite numerous at death. On the other hand, rabbits are usually the animals of choice for inoculations, being very highly susceptible to hemorrhagic septicemia infections. However, the fact that rabbit septicemia exists among so many of the rabbitries throughout the country detracts from the value of these animals for diagnostic inoculation purposes at the present time.

It has happened more than once, in our investigations of hemorrhagic septicemia, now extending back over a period of five years, that rabbits have died following an inoculation with material known not to contain the hemorrhagic septicemia organism, and yet the heart-blood of the dead rabbits yielded the organism when cultured. It should be stated in this connection that these rabbits invariably showed some serious pathological alteration in the thoracic cavity, usually fibrinopurulent pleurisy and pericarditis, with some pneumonia.

Rabbits dying in 16 to 48 hours following an intravenous or a subcutaneous injection of a pure culture of the hemorrhagic septicemia organism rarely, if ever, show any pathological alterations in the thoracic cavity. Rabbits dying in even a longer time, up to 7 days after inoculation, may not show any lesions except petechial hemorrhages in certain organs and on serous

membranes. Table 1 gives the result of the inoculation of rabbits with emulsions of the tissues under examination.

TABLE 1.—ANIMAL INOCULATIONS WITH TISSUES

Rabbit No.	Date	Tissue	Amount	How	Result
1	Jan. 29, 1921	Lung	2 c. c.	Intravenously	Lived.
2	do.	Muscle	1 c. c.	Subcutaneously	Died, 24 hours.

The heart-blood of rabbit No. 2 yielded a pure culture of a small Gram-negative bacillus, producing a uniform, slight turbidity and slight, viscid sediment in plain bouillon, a moist grayish-white growth on ascitic agar, no change in litmus milk, no growth on potato, no gas in dextrose, lactose and saccharose fermentation tubes, with acid in the dextrose and saccharose but not the lactose bouillon. The organism was believed to be *Bacterium bovissepticum*.

DIRECT CULTURES

Lung.—From the exudate in the bronchioles, seeded on ascitic agar, was isolated a small, nonmotile, Gram-negative bacillus with cultural characteristics very similar to the organism isolated from the muscle by rabbit passage. This organism was planted in Hiss's dextrose, lactose and saccharose serum-water medium instead of fermentation tubes. There was no gas production, but acid in the dextrose and saccharose tubes. Cultures in plain bouillon soon flocculated to the bottom of the tube, leaving the supernatant fluid nearly clear. This organism was believed to be *Bacterium bovissepticum*.

Muscle.—This tissue proved to be contaminated, but by plating on ascitic agar, using the method described by Klix (1), an organism was obtained that corresponded with the foregoing, morphologically and culturally, and was believed to be *Bacterium bovissepticum*. The bouillon cultures, however, appeared to grow more heavily and did not clear up like the cultures of the lung strain.

Summary.—From the lung and muscle by direct cultures, and from the muscle by rabbit passage, three separate cultures were secured, all apparently alike and corresponding to *Bacterium bovissepticum*. No particular attention was paid, at this time, to the difference noted in the bouillon cultures of the lung and muscle strains, as practically the same difference had been

noted many times in working with a single strain planted in different batches of culture media. In fact we have demonstrated, in some unpublished experiments, that we can control the character of the growth in bouillon by altering the composition of the medium. These differences include sediment, turbidity and surface growth.

Having isolated the organism from the lung, but having failed to kill a rabbit with an emulsion of the lung tissue, the question was raised as to the virulence of the lung strain. To determine this, rabbit inoculations were resorted to, using cultures obtained directly from the lung (LD), directly from the muscle (MD) and from the muscle through rabbit passage (MR).

TABLE 2.—TESTS OF VIRULENCE OF THE THREE STRAINS

Rabbit No.	Weight (Grams)	Condition ¹	Date	Culture	Amount (c.c.)	Result.
3	2,730	Used	Feb. 25, 1921	LD	0.0001	Lived.
4	2,100	Normal	do.	do.	.0001	
			Mar. 2, 1921	do.	.001	
			Mar. 7, 1921	do.	.005	
			Mar. 14, 1921	do.	.1	
			April 5, 1921	712	.0001	Died 22 hours.
5	2,240	do.	do.	712	.0001	do.
6	3,000	Used	Mar. 14, 1921	LD	.1	
			April 5, 1921	do.	.001	Lived.
7	2,420	Normal	do.	do.	.001	do.
8	3,040	Used	Feb. 25, 1921	MD	.0001	do.
9	2,100	Normal	do.	do.	.0001	do.
			Mar. 2, 1921	do.	.001	Died, 48 hours.
10	2,240	do.	do.	do.	.001	Died, 19 hours.
11	1,840	Used	April 5, 1921	do.	.001	Died, 22 hours.
12	2,200	Normal	do.	do.	.001	do.
13	3,700	Used	Mar. 23, 1921	MR	.001	Died, 6 days.
14	3,000	Normal	do.	do.	.001	Died, 24 hours.
15	2,360	Used	April 5, 1921	do.	.001	Died, 22 hours.
16	2,900	Normal	do.	do.	.001	Died, 23 hours.

¹ Rabbits designated as "used" had received one or more previous injections of hemorrhagic septicemia organisms and were used in these experiments for the purpose of noting any degree of immunity conferred by these injections. Such rabbits were generally used in pairs, one normal and one "used," and in only one instance (rabbit No. 13) did the "used" rabbit show any appreciable resistance above that shown by the normal rabbit.

DISCUSSION OF THE VIRULENCE TESTS

Rabbits (Nos. 3-7) injected intravenously with varying amounts (0.1 to 0.0001 c.c.) of 24-hour bouillon cultures of the strain isolated directly from the lung, in single or repeated doses, failed to succumb. The doses injected were many times the dose of a virulent culture necessary to kill rabbits. Four injections, at about weekly intervals, failed to immunize a rabbit (No. 4) against a virulent strain of *Bacterium bovis septicum* (No. 712), the rabbit dying as soon as the normal control (No. 5).

In the case of the strain isolated directly from the muscle (MD) all rabbits receiving a dose of 0.001 c.c. of a 24-hour bouillon culture died promptly. Two rabbits resisted a dose of 0.0001 c.c. One of these (No. 8) had been used in a previous experiment, and may have been partially immune. The injection of the same amount in a normal rabbit (No. 9) failed to kill, and when this rabbit was given a second injection five days later, it did not die until 48 hours later, the control (No. 10) dying in 19 hours. This might be interpreted as due to a slight immunity resulting from the first injection, or to some natural immunity.

The strain isolated from the muscle through rabbit passage (MR) killed consistently in doses of 0.001 c.c. One used rabbit (No. 13) showed sufficient resistance to withstand a killing dose for over 5 days, sickening and dying on the sixth day. The minimum fatal dose of the culture was not determined.

From these few experiments we came to the conclusion that we had been successful in isolating both a virulent and a non-virulent hemorrhagic septicemia organism from the same animal, the virulent type from the muscle and the nonvirulent type from the lung. So far as determined these were typical strains of *Bacterium bovis septicum*, and identical so far as cultural and morphological characteristics were concerned, with the exception of the growth in bouillon as previously noted.

Nonvirulent organisms indistinguishable from members of the hemorrhagic septicemia group have been isolated from the respiratory tract of various animals (calves, hogs, rabbits) by the present writer on previous occasions. Others have reported similar findings. Likewise, the present writer has isolated virulent hemorrhagic septicemia organisms from the lung, heart muscle or blood of animals dying of clinical hemorrhagic septicemia (calves, sheep, hogs, rabbits). This instance, however, is the first where both virulent and nonvirulent organisms have been recovered from the same animal. It is quite likely, however, that nonvirulent organisms have failed to receive recognition when virulent varieties were present to overshadow them.

PREVIOUS OBSERVATIONS

In a paper (2) read before the Missouri Valley Veterinary Association two years ago, I made the following statement:

"It would appear from an examination of a large number of strains of these (hemorrhagic septicemia) organisms that there

are minor cultural differences between these strains, although certain morphologic and physiologic properties seem to be firmly fixed. There are also slight differences serologically. These suggest the possibility of there being a number of types of the organism, just as we have the different types of the pneumococcus or the dysentery bacillus. Whether it will be possible to correlate these differences with any important pathogenic properties will be revealed by future investigations."

Manninger (3) has observed the coexistence of virulent and nonvirulent fowl-cholera organisms (*Bacterium avisepicum*) in 6-months-old bouillon cultures, his attention being drawn to them when transfers were made to agar and two types of colonies developing on this medium. When the two types were separately replanted in bouillon, they showed a marked difference, especially in the character of the sediment. The two types cross-agglutinated.

In a recent publication De Kruif (4) has reported some observations on the coexistence of individuals of different degrees of virulence in cultures of the bacillus of rabbit septicemia, isolated from spontaneous infections occurring among the normal animal stock in the laboratories of the Rockefeller Institute. Cultures were made from the heart-blood in 10 per cent defibrinated rabbit-blood broth, incubated for 24 hours, and then plated out in 5 per cent rabbit-serum agar. Colonies were fished to rabbit-serum broth, incubated and examined, then streaked on 10 per cent rabbit-serum agar, these cultures being kept for study.

In a series of well-executed experiments De Kruif has been able to isolate two types of organisms from these cultures of the rabbit septicemia organism. These types have several points of difference culturally (bouillon growth and agar colonies), and there is a wide difference between the degrees of virulence for rabbits. These differences may be summarized as follows:

TABLE 3.—DIFFERENCES BETWEEN TYPES DESCRIBED BY DE KRUIF

	Type D	Type G
Bouillon (plain or serum) Agar (serum) Virulence for rabbits	Diffuse Opaque, fluorescing colonies High	Granular (floculates readily) Translucent, bluish nonfluorescing Low

The two types of organisms are morphologically indistinguishable and possess identical fermentation reactions. Rabbits sur-

living inoculation with Type G are later found to be able to withstand multiple lethal doses of Type D. Agglutination and absorption tests strongly suggest the antigenic identity of the two organisms.

Careful reading of De Kruif's report leaves somewhat in doubt the exact origin of the two types. The original heart-blood cultures were plated out and the cultures from which he subsequently separated the two types were descendents of single colonies. Yet, after another plating, he was able to get the two types, and these, once separated, appeared to retain perfectly their characteristics of cultural growth and virulence. Having read the publication of De Kruif, it is perfectly natural to attempt some explanation of his findings, or to reconcile our observations with those of De Kruif.

As previously stated, various animals, especially rabbits, frequently harbor hemorrhagic septicemia organisms in some part of the respiratory tract. The heart-blood of rabbits in apparent health, bled for culture medium purposes, has been found to contain hemorrhagic septicemia organisms. Whether these have been caused to enter the blood-stream, at death, in a mechanical way, incident to the bleeding process, or whether the blood stream harbors a few organisms from time to time, can not be stated definitely.

Animals harboring hemorrhagic septicemia organisms are not necessarily immune to artificial infection with virulent strains of the same organism, as shown by Davis (5). This is not always true, however, of rabbits having subcutaneous abscesses caused by local infections with the rabbit septicemia bacillus. Many of these animals exhibit considerable immunity to artificial infection.

With these facts in mind, and with the knowledge that the blood stream may harbor simultaneously two organisms, not necessarily related, it seems easily possible that in a terminal infection, as in rabbit septicemia, we might have two organisms, in this case closely related, in the blood stream at the same time.

In the case of the calf dead of hemorrhagic septicemia, reported in this article, we have shown that the animal had in its system, simultaneously, at death, both a virulent and a non-virulent hemorrhagic septicemia organism. The blood was not cultured, but it is quite likely that it contained the virulent strain, and we can not say that it did not contain the nonviru-

lent strain. Neither can we say that the muscle, from which the virulent strain was isolated, did not contain the nonvirulent strain. By the time that it was apparent that we had the two strains, the original material had been discarded.

These findings tend to complicate, for the time being, at least, our views on the etiological significance of the hemorrhagic septicemia organisms and their bearing on immunological reactions. May the presence of hemorrhagic septicemia organisms of a low virulence stimulate the production of antibodies sufficient to protect the host against infection with a virulent epizootic strain, or may it have just the opposite effect, namely, that of sensitizing the animal and rendering it more susceptible?

Can a nonvirulent strain, such as was isolated from the lung of the calf, undergo mutation and become virulent? The writer has been able to change, at will, the character of the growth, in bouillon, of a virulent culture of *Bacterium bovissepticum*, by simply altering the composition of the medium. Future experiments may show that we can alter the virulence in the same way.

We have reason to believe that alterations in virulence do take place under natural conditions. In fact, our present views on the nature of the disease are based on that assumption. Some strains of the hemorrhagic septicemia organism retain indefinitely their virulence for laboratory animals. Others become avirulent in a comparatively short length of time. To restore virulent properties to a strain that has become avirulent is a difficult task, with our present knowledge. The demonstration that organisms of low virulence suddenly become exalted in the animal body is even more difficult.

REFERENCES

1. KLIX, H. C. A simple method of isolating bacteria from pathological material. Jour. Lab. and Clin. Med., vol. 6 (1920), No. 2, p. 104.
2. HOSKINS, H. P. Some considerations of the hemorrhagic septicemia group. Proc. Mo. Valley Vet. Assoc., 1919. (In preparation.)
3. MANNINGER, R. Ueber eine Mutation des Geflugel-cholera-bazillus. Centbl. Bakt., etc., I, vol. 83 (1919), p. 520. (Abst. in Bul. Inst. Pasteur, vol. 18 (1920), No. 10, p. 330).
4. DE KRUIF, P. H. Dissociation of microbic species. I. Coexistence of individuals of different degrees of virulence in cultures of the bacillus of rabbit septicemia. Jour. Expt. Med., vol. 33 (1921), No. 6, pp. 773-789.
5. DAVIS, D. J. Further observations on subcutaneous abscesses in rabbits. The carrier state and its relation to rabbit septicemia. Jour. Infect. Diseases, vol. 21 (1917), No. 3, pp. 314-321.

CLINICAL AND CASE REPORTS

(Practitioners and others are invited to contribute to this department reports of unusual and interesting cases which may be helpful to others in the profession.)

PATHOGENIC EFFECTS OF CAPILLARIA WORMS ON CHICKENS

By E. L. STUBBS and HOWARD CRAWLEY

Philadelphia, Pa.

ON September 6, 1921, three White Wyandotte chickens, three months old, were brought to the laboratory of the Bureau of Animal Industry, Pennsylvania Department of Agriculture, for examination. The owner is a breeder of high-class birds and has a flock of 175, at that time consisting of 50 adult hens, 50 pullets and 75 young chickens. He was having no trouble with the hens or pullets, the infection being confined to the younger members of the flock. At the time given, three or four had died, and nine others were affected.

The symptoms were droopiness, slight diarrhea and progressive emaciation, this condition terminating in death after about a week. The flock was being fed plenty of greens, boiled oats, all the mash they wanted, and grain at night.

At autopsy all three of the birds received at the laboratory showed a chronic proliferative enteritis, which was very severe in one of the three, the intestinal walls being greatly thickened. This condition extended from the gizzard almost to the rectum. Microscopical examination of scrapings of the mucous membrane and the contents of the intestinal lumen showed numerous nematodes. These were of two species (*Heterakis vesicularis* and *Capillaria* sp.). The former worm is normally a parasite of the caeca, and is said to measure 7 to 13 mm. for the males, and 10 to 15 mm. for the females.

In the case of the most badly affected chicken, however, the *Heterakis* worms were present throughout the entire length of the intestine. Further, while morphologically identical to *H. vesicularis*, they were small for this species. The males ranged from 4.0 to 5.4 mm. long, and a mature female, as evidenced by the presence of eggs, was but 7.2 mm. long. An immature female gave a length of 4.6 mm.

While these worms probably aided in bringing about the con-

dition described, the greater blame must be placed on the *Capillaria*. The female of this form varied from 11 to 13 mm. long and the eggs measured 45 to 25 microns. The males were somewhat smaller. The genus *Capillaria* has recently been separated from *Trichosomum*, and is made up of worms the posterior ends of which are but slightly thicker than the anterior, whereas in *Trichosomum* the posterior ends are much thicker. All of these so-called whipworms have the habit of attaching themselves to the mucous membrane of the alimentary canal, the result of which is profound irritation and the secretion of a large quantity of mucus. In consequence the group is distinctly pathogenic.

The literature does not permit of a positive determination of the species of the worm found. Travassas (Memorias do Instituto Oswaldo Cruz, vol. 7, pp. 146-172, 1917) gives two species of *Capillaria* as present in domesticated chickens, *C. retusa* and *C. strumosa*. These are separated according to the relative lengths of the narrow and broad portions. This, however, is not a particularly good character, for the worms taper rather regularly, and it is not at all easy to say where the narrow part ends and the broad part begins. This same author gives the following figures for the size of the eggs: *C. retusa*, 56-60 by 28-32 microns; *C. strumosa*, 60 by 25 microns.

As already mentioned, the eggs of the worm under consideration measured 45 by 25 microns. It is possible, therefore, that it is a new species, but a more extended study than has yet been made would be necessary in order to determine this point.

The observation, however, is considered worthy of record, owing to the undoubted pathogenicity of the worm to chickens. It is probably also commoner than is generally supposed, since its position close up against the mucous membrane and embedded in mucus allows it to be overlooked unless a careful search is made.

Dr. H. B. Wilkerson, of Bedford, Va., writes that he has had excellent results in the treatment of cerebrospinal meningitis in horses by the use of fluid extract of aconite. A dose of 5 minims per 100 pounds body weight is given every 3 hours. The treatment is continued until the symptoms of delirium disappear.

ABSTRACTS

THE SO-CALLED BOTRYOMYCOSIS IN MAN. G. Romano. Tumori (Rome), vol. 8, p. 129, Aug. 10, 1921. (Abst. in Jour. Amer. Med. Assoc., vol. 77, p. 1139, Oct. 1, 1921.)

Romano's deductions from three cases personally observed and from the scanty literature on botryomycomas are that there is no identity between the disease in man and in horses. Even those with the most experience are dubious whether to class the nodule as a neoplasm or a granuloma, and the term "human botryomycosis" is misleading.

TUBERCULOSIS IMMUNIZING VACCINE. N. Raw. Brit. Med. Jour., 1921, No. 3147, p. 594. Abs. in Amer. Rev. of Tuberc., vol. 5 (1921), p. 119.

Since 1906 human, bovine and avian tubercle bacilli have been subcultured by the author every month. The present growths represent the 184th generation. The growths are still luxuriant and true to type, but they do not produce tubercles and are completely nonpathogenic to animals. The pathogenicity has been tested every year. No change was noted until the 94th generation. After that time attenuation became marked, and after a year or two the cultures were avirulent. Treatment of disease by vaccines prepared from attenuated organisms naturally means that the production of antibodies will take place rapidly without any preliminary shock to the system, such as invariably follows the injection of vaccines prepared from virulent strains of bacteria. With a view to elucidating the real amount of tuberculosis in man caused by the human and bovine types of bacilli, and also as to immunity produced by one infection toward the other, Raw instituted clinical observation on a large scale in a Liverpool hospital of 900 beds, of which he had charge for eighteen years. In no case of primary pulmonary tuberculosis did he observe, during the course of the illness, tuberculosis of bones, joints, glands or skin, nor any instance of meningitis. Among the surgical cases of tuberculosis, 28 developed lung symptoms and 25 died. In all cases the infection of the lung was either by direct extension from cervical lymph nodes to the apex of the lung, or from a primary focus

in the abdomen extending upward through the diaphragm to the bronchial nodes and lungs. This large clinical experiment convinced Raw that the human body is attacked by two quite distinct forms of tuberculosis: the one conveyed from person to person by direct infection and attacking chiefly the lungs, and the other conveyed by milk from tuberculous cows, and developed in the first few years of life. These two diseases are caused by different types of tubercle bacilli which will not live in the body at the same time; and one disease produces immunity to the other. Hence, Raw always uses a vaccine prepared from bovine cultures in the treatment of the human infections and vice versa. The vaccine which he has had prepared from his attenuated cultures is an emulsion of the bacilli, and contains all the products of the bacillus. It is nontoxic and avirulent, and produces no reaction even in large doses. For purposes of immunization in susceptible children 6 injections are given at weekly intervals. This course is repeated in 3 months. The doses recommended are 0.001, 0.002, 0.003, 0.004, 0.005, 0.006 mgm. No symptoms have been observed to follow these injections. In the treatment of the active disease the doses are much larger than have been possible up to now. At least 12 injections should be given at intervals of seven days in doses increasing from 0.001 to a maximum of 0.025 mgm. The vaccine should be freshly prepared from the cultures and should not be used after one month. It can be used with complete safety in any stage of the disease, and even in advanced cases great relief from night sweats and toxic symptoms have been noted. The results in suitable cases are excellent. Raw has succeeded in immunizing completely highly susceptible animals by the use of attenuated cultures, and he firmly believes that if all children with a tuberculous history could be safely vaccinated in the manner described they would be placed in a better position to resist infection at home.

RESEARCHES ON INFECTIOUS ABORTION IN MARES. M. Carpano.

Ann. Ig. (Rome), 29 (1919), No. 11, pp. 752-779. Abs. in

Exp. Stat. Rec., vol. 45 (1921), p. 179.

The author reviews the literature on infectious abortion in mares and joint-ill or arthritis in foals and reports the results of his study of this disease in Italy, where abortions in mares,

particularly the imported stock, are quite common and the foals born alive in localities where abortions have occurred are often affected with polyarthritis.

Two microorganisms have been isolated from pathological cases, *Bacillus abortus equi* and a micrococcus of the type of *Streptococcus equi*, the former being considered the causative agent. The characteristics of these organisms are described and successful experiments are reported on the diagnosis of the disease by serum agglutination and on the therapeutic and prophylactic treatment of the disease with a mixed polyvalent serum.

AN EPIZOOTIC OF FOWL TYPHOID IN FRANCE. F. d'Herelle.
Rev. Gén. Méd. Vét., 29 (1920), No. 339, pp. 128-130. Abs.
in Exp. Stat. Rec., vol. 45 (1921), p. 181.

The loss occasioned during a series of widespread outbreaks of disease among poultry in France was in a great majority of cases due to fowl typhoid (*Bacterium sanguinarum*), the existence of which had not previously been reported in that country. It is said that in certain places there occurs in coexistence with fowl typhoid another disease of undetermined etiology which causes a high mortality among fowl and geese, the latter of which are not susceptible to fowl typhoid.

IMMUNIZATION AGAINST BLACKLEG WITH GERM-FREE FILTRATES.
E. Gräub and W. Zschokke. Schweiz. Arch. Tierheilk., 62
(1920), Nos. 2, pp. 52-65; 3, pp. 112-122. Abs. in Exp. Stat.
Rec., vol. 45 (1921), p. 180.

From a series of experiments on the immunization of guinea pigs, sheep, and cattle against blackleg, the authors conclude that a single subcutaneous injection of blackleg filtrate produces an immunity which protects the animals against double the ordinary fatal dose of virulent blackleg material. A second inoculation with attenuated virus which is not fatal to normal animals, but in itself produces only slight immunity, greatly increases the immunity produced by the filtrate. It is considered that the immunity is not only active and lasting against the strain used for the preparation of the filtrate but against other strains as well.

In practice, the single immunization with blackleg filtrate is recommended for cattle which are exposed to blackleg infection only during the pasture season and the double method for animals continually exposed to infection. Inoculation with the virus should be given not earlier than 10 days nor later than two months after the filtrate inoculation.

EXPERIMENTS CONCERNING THE ACTION OF COLD ON THE BODY.

D. Schade. München. Med. Wehnschr., 1919, p. 301.

Regarding the influence of cold on the body, three effects are discernible: (1) The harmful action through colloidal tissue change in the cells. The injurious effects on the vitality of the cell consist in a change in the normal colloidal condition of the cell protoplasm, through which the colloidal protoplasm disappears (vacuolizing degeneration).

(2) The remote effects of cold which are particularly reflex in character, proceed from the sympathetic nervous system (changes in the distribution of blood to the internal organs, muscular contractions, muscular flaccidity, anomaly of secretion of the internal glands, for example, the kidneys).

(3) Lowering of immunity. Experiments conducted on animals exposed to intense cold out of doors, proved that such animals possessed a lessened resistance to various infecting agents.

J. P. O'LEARY.

CONCERNING THE NATURE OF NECROTIZING PNEUMONIA IN SWINE PLAGUE AND HOG CHOLERA. Muller and Schmid. München. Tierarztl. Wehnscher., 1920, p. 274.

The authors do not share in the view that swine plague has changed its nature in the course of the year and that the classical necrotizing form proceeds from the same cause as the chronic catarrhal form. They are of the opinion that the classical necrotizing form of swine plague is by no means a particular infection, but rather the pectoral form of acute virus pest (hog cholera).

ARMY VETERINARY SERVICE

THE PERCHERON AS AN ARMY HORSE

Major Gen. Sir John Moore, Director of the British Army Veterinary Services in France, has written an excellent book on "Army Veterinary Service in War." From this book the following paragraphs are taken:

AMERICAN HEAVY DRAUGHT HORSES

Though not so weighty and powerful as our best English heavy draughts, the American Percheron or crossed Percheron on the whole gave great satisfaction and was universally liked during the war in France. He teams well, is active, has a good constitution, is a good doer, and has good, sound legs and feet. The absence of hair on the legs was a great asset in comparison to our English heavies under the muddy circumstances of winter in the forward areas. He is best described as a medium heavy, and as such he is quite big enough for the heavy draught purposes of war. As a draught animal I do not consider him in any way superior to our English Shire or Clydesdale, or to the smaller of these breeds of which he may be considered a parallel; but there is no doubt that in war he can be more generally placed, and can stand hardships better than our heavy breeds. Whether or not his relatively satisfactory service in France was due in part to a return to the country of his ancestors can only be surmised. He certainly stood the climate very well. He shipped to the country on the whole well, and suffered less from serious respiratory sickness on landing than the heavy Shires and Clydesdales. At the same time it must be remembered, as I have previously remarked, that respiratory sickness is preferable to infection, and in all classes of animals incidents of this form of disease were very greatly reduced by the rigid taking of temperatures on landing and previous to drafting to units. Moreover, the heavy mortality experienced amongst Shires and Clydesdales was during the first winter of the war, when they were practically without shelter of any kind and subjected to incessant rain—a very different state of affairs to the ample and good accommodation provided by such times as American shipments of heavy animals commenced.

An idea of utility may be gathered from the records of one veterinary hospital in France, at which out of 120 heavy draught horses east and sold in two years, 116 were British (the

officer commanding was unable to differentiate Clydesdale from Shire) and four only were American.

In another veterinary hospital, a committee of officers, Royal Army Veterinary Corps, drew attention to the fact that a fairly large percentage of heavy draught American horses had side-bones, but expressed the opinion that this defect could soon be bred out by careful selection of sires; in like manner to its exclusion in our English breeds following a more particular classification of the defect as an unsoundness.

MULES

In animal kind, the hero of the late World's War—as in all other wars in which he has participated—that paragon of excellence, the mule, finds the premier place. He stands out prominently as a first-class war animal, and under all circumstances, in all climates or situations, whether amongst the mud of France, in the deserts of Egypt, on the plains of India, or on the hill-tops of the Himalayas, in burning heat or icy snow, his achievements have been marvelous. He is as indispensable to war as a commander of the forces, and no history of war is complete without him. Any demerits he may possess are attributable to a psychology peculiarly his own, but his merits are double distilled, and little more remains to be said on that account.

AMERICAN MULES

Of all countries in the world, none can surpass the United States of America for the production of mules, nor compete with it in general resources. The mule population of the States amounts to nearly 3,000,000, and the fountain never seems to run dry. During the South African war, the British government purchased 80,524, and though I have no actual figures to guide me, I should say purchases during the late war amounted to considerably over a quarter of a million. The strength of mules in the British Expeditionary Force, France, alone amounted to roughly 90,000.

All sorts and sizes of mules are bred in the United States, from the small miner 12-3 or 13-0 to the magnificent sugar mule 16-2 and over. It pays better to breed a mule than a horse, and the market is for mining, lumber trade, and the cotton and sugar industries of the South. The real home of the American mule, and especially the large mule, is Missouri, though lighter mules are raised in Texas. If the magic names of Lathrop, Missouri and Kansas City are whispered into the long ear of

an American mule, he will immediately start a conversation about his old home, blue grass, Indian corn shucks and stover, his fine big mother, his French and Spanish ancestry on his father's side, and he will air his views on stockyards and "niggers" generally. The American mule is wonderfully docile, and to my mind, quite the most handsome creature of the genus *Equidae*, and lovable withal. His power is best appreciated by standing close up to him: at a distance he may look mean.

As a rider, a mule is of little value, a supreme will and an iron mouth, as a rule, prove the drawback.

* * * Their happy nature goes a long way towards their success. They have a habit of worming their way into the hearts of our soldiers, and very soon friendly relations are established that work for the common good. Their endurance, their comparative freedom from sickness, their pluck and stout heartedness when properly treated, their ability to perform work under adverse circumstances and when short commons are necessitated, are their usual attributes; and their employment in war is a great economic factor. These remarks stand for all mules, whether American or otherwise.

The majority of American mules employed in the various theatres of war were for light draught purposes, supplying the place of light draught horses in ammunition columns, etc., of formations, and receiving the same rations as light draught horses. To the latter factor the superiority of the mule over the light draught horse is greatly ascribed. If well fed, he thrives on work, and in times of idleness he will quickly get fat. As an instance of ability to stand the vicissitudes of campaign I will quote again the Somme operations in 1916. This offensive period resulted in 16,074 debility (poor condition) cases evacuated to veterinary hospitals on lines of communications, of which total only 404 were mules. The percentage of inefficiency was 4.42 for horses and 0.61 for mules: horses suffered, therefore, seven times more than mules. During the winter seasons they gave us far less trouble than horses (1 to 3, about) from skin disease, and respiratory disease was practically nil. These are very strong arguments in favor of the mule. I call to mind the limbered general service wagon mules of the 17th Lancers going through the streets of Abbeville on a snowy day. They were pictures of health, and the bloom of their coats shone in spite of the snow. It is only one instance of many, and it made one feel proud to belong to our army.

ASSOCIATION NEWS

AMERICAN VETERINARY MEDICAL ASSOCIATION

Proceedings of Fifty-Eighth Annual Meeting, Denver, Colo., September 5 to 9, 1921

(Continued from December JOURNAL)

THURSDAY AFTERNOON, SEPTEMBER 8, 1921

GENERAL SESSION

The meeting convened at 1:30 p. m., President David S. White presiding.

REPORT OF AUDIT COMMITTEE

PRESIDENT WHITE: The first item of business will be the reports of committees. Is the Audit Committee ready to report?

(Dr. H. Preston Hoskins read the report of the Audit Committee, as follows:)

Your committee begs to report that we have examined the accounts of the Treasurer, Dr. Jacob, and a careful audit of his receipts and disbursements shows these to be correct.

The books of the Secretary, Dr. Mayo, have received a very thorough audit at our hands, and the accounts have been found to be correct.

The accounts of the JOURNAL, in the hands of the Editor, Dr. Mohler, were not audited by your committee, these having previously been examined by an accountant as provided by the Constitution and By-Laws.

Your committee asks to be allowed to make several recommendations:

1. There appears to be no valid reason for requiring the accounts of the Editor to be examined by a qualified accountant (see paragraph M of Section 7 of Article V of the Constitution), while this is not required of the Secretary or the Treasurer.

Article 17 of the By-Laws provides for an Auditing Committee, but attention is directed to the fact that the personnel of this committee may be completely changed from year to year, and a committee may not have a single experienced member on its personnel. The five members are usually widely distributed geographically and do not have an opportunity to examine the various books and accounts until the annual convention, when the time of the committeemen is often at a premium, a considerable amount of time being required for a careful audit.

In view of the fact that the Association has a fiscal year, it would appear that the proposed audits might properly be made at the end of each fiscal year.

2. Your committee would also direct attention to the heavy financial loss being sustained at the present time by the Association, in connection with the remittance from Canadian members for initiation fees and dues. It would appear that this loss, in connection with the present difference in exchange, runs well over one hundred dollars per year. This loss could be naturally reduced, we believe, by having

the Treasurer maintain a Canadian depository until such time as exchange rates return to normal. Canadian banks are at present paying 5½ per cent interest on time deposits, and if necessary the funds on time deposit in the United States could be reduced an amount equal to that being kept on deposit in Canada.

H. PRESTON HOSKINS, *Chairman*,
R. H. MARSTELLER,
H. E. BEMIS,

Auditing Committee.

(It was voted, on motion of Dr. Fitch, seconded by Dr. Hilton, that the report be received.)

REPORT OF EXECUTIVE BOARD

PRESIDENT WHITE: Has the Executive Board a report to make?

DR. HILTON: At the last annual session this Association referred to the Executive Board the question of considering whether or not the positions of Secretary, Editor and Business Manager should be combined. The Executive Board, in order to look into that matter very closely, appointed a subcommittee of the Board. This subcommittee has been looking into the question from every angle during the past year, and it has reported to the Executive Board, which has accepted the recommendations of the subcommittee.

In looking over the situation with regard to the appointment of a permanent officer for these positions the Executive Board has also to consider our financial status. From the report of the Treasurer you will note that we are only just balancing ourselves. We are going to draw on our capital account, and the Executive Board is of the opinion that before a position of this kind is made permanent our capital account should pay sufficient revenue to pay a greater portion of our operation expenses. Our Treasurer has at the present time, as you will note in his report, money invested in bonds, also money on time deposit. We are endeavoring to get as much of that money invested in bonds as possible, so we can increase the interest on our principal.

It is therefore recommended by the Executive Board that, in view of the facts which I have outlined, the officers be maintained for the coming year as in the past, and the Executive Board therefore recommends that the present incumbents of these positions, Dr. Mayo, the Secretary, and Dr. Mohler, the Editor and Business Manager of the JOURNAL, be maintained at the same remuneration as last year for the coming period.

The Executive Board also wants to recommend an amendment to the Constitution, but I think it is very important that before this notice is given you clearly understand the object of the Executive Board in recommending this amendment. Under the present Constitution it is one of the duties of the Executive Board to recommend to this Association yearly the appoint-

ment of a Secretary, Editor and Business Manager. In the work of the Executive Board during the past year it was found that so long as the Constitution required the Executive Board to recommend the appointment to these positions each year, and until the Association is in a position to make those positions permanent, they will experience a great deal of difficulty in getting anyone to consider accepting such a position.

We don't know when the Association will be in a position to take such action. We are making an extra campaign during the coming season. We have organized to try to increase our membership. At the present time, before this meeting opened, we had but 4,000 active paying members. We have taken in 225 new members, but there have been some resignations, so we may reckon upon approximately 4,000 paying membership. We want to double that; we have to double that if we are going to extend and become permanent, and for that reason we are making a special effort to get new members.

I thought it well to enlarge on that, so that no member of this Association would think that the Executive Board had something that it didn't want you to understand. That is the only reason. Under the Constitution as it stands at present a person appointed to either of those positions or the combined position may be recommended yearly, but you can be sure if he is an individual capable of filling those combined positions he naturally asks what are the chances regarding his permanency, and he sees the Constitution and sees that the Executive Board has to report every year and recommend individuals for those positions.

The Executive Board therefore recommends that paragraph L of section 7 of the Constitution be amended by eliminating the word "yearly." If the recommendation is accepted, it will have to be laid on the table until next year before it becomes operative.

DR. ELIASON: As I understand, the proposed amendment was to be incorporated as read by Dr. Hilton, at this time.

DR. HILTON: The amendment is just to remove the word "yearly" from that section.

DR. ELIASON: Wouldn't it appear to you that there also might be a provision as to how long they are to remain in office? Where it is a definite appointment there ought to be some agency for removal.

DR. HILTON: There are. The Constitution provides that any of those individuals can be removed from office if necessary, provided it is recommended by the Executive Board and approved by the general session.

PRESIDENT WHITE: This is simply received at this time and will be acted upon at the next meeting.

DR. JENSEN: It appears to me that this body has nothing whatever to do with the secretaryship. No change could be made

unless the Executive Board recommends it first, and then we can have a second whack at it. I am very much opposed to such a proposition as that.

DR. CARY: I move that the report be accepted and the amendment be referred to the Executive Board for action next year. (The motion was seconded by Dr. Dimock and carried.)

SECRETARY MAYO: The following applications have been favorably recommended by the Executive Board:

C. B. Carpenter, Ithaca, N. Y.
Pedro de Guia, Manila, P. I.
J. B. Morales, Manila, P. I.
Paulina M. Vytiacho, Manila, P. I.
H. H. Sheeler, Buhl, Idaho.
W. M. McLeod, Manhattan, Kans.
Thomas Sims, Hutchinson, Kans.
Stephen H. Hopkins, Kans.
William Harvard, St. Augustine, Fla.

The Board also recommends that the application of Dr. Herminio Bernas, Iloilo, Philippine Islands, be accepted under suspension of rules. He is a graduate of San Francisco Veterinary College in the year 1918. The college has been dropped previously, but as it has been out of existence, and is out of existence at this time, they recommend that his application be accepted.

DR. HOSKINS: I move that the report of the Executive Board be received and that under suspension of the rules the applicants whose names have been read be admitted to membership by vote of the Association.

(The motion was seconded by Dr. Dimock and carried.)

DR. CONNAWAY: I move that the rules be suspended and Dr. Bernas be elected to membership.

(The motion was seconded by Dr. Hoskins and carried.)

SECRETARY MAYO: The Executive Board recommends that Dr. J. W. Buchanan, of Union, S. C., be expelled from the Association for violation of the Code of Ethics.

DR. HOSKINS: I move that the recommendation of the Executive Board be received and approved by the Association.

(The motion was seconded by Dr. Goss.)

DR. CONNAWAY: Some of the men around me seem to want to know what are the circumstances. We wouldn't like to cut a man's head off without knowing the circumstances.

SECRETARY MAYO: I think it is right that they should know. A member from North Carolina sent in some advertisements from local papers of the Carolinas Remedies Company, of which Dr. Buchanan is the president, and said that they didn't like it down in South Carolina. I wrote to Dr. Buchanan and told him that complaint had been made and that I hoped that he would discontinue this. I also wrote to the dean of the college from which he graduated, sending him copies of the advertisement,

and asking him if he couldn't bring some pressure to bear on Dr. Buchanan to discontinue. We weren't able to accomplish anything. "Satisfaction guaranteed," and so on. It is glaring. After we couldn't get him to discontinue it, charges were preferred by the Resident Secretary from that State, and Dr. Buchanan was notified to appear and defend himself against those charges. He replied, tendering his resignation to the Association. I notified him then that in my judgment the Executive Board would not accept the resignation of a member against whom charges were pending, and that he should appear and defend himself against those charges, and he has made no answer to that.

DR. BELL: I was a member of the Executive Board of the Southeastern States Association last winter, and Dr. Buchanan had an application in for membership, and we rejected him on those grounds.

(The motion to accept the recommendation of the Executive Board that Dr. Buchanan be expelled from the Association was put to vote and was carried.)

SECRETARY MAYO: At the last meeting in Columbus the Executive Board was authorized to appoint a Council on Chemistry and Pharmacy similar to that of the American Medical Association. The Executive Board has had this under consideration during the past year, and it recommends that the Council on Chemistry and Pharmacy be made a permanent committee, consisting of five members, one to be appointed for one year, one for two years, one for three years, one for four years and one for five years—that is, at first—and that one shall go off this committee each year thereafter.

DR. STANGE: Wouldn't that require an amendment to the Constitution and By-Laws?

SECRETARY MAYO: I think it would. It hadn't occurred to me before. "There shall be the following standing committees consisting of five members except as otherwise provided." It gives the five committees, but it would seem to me that they can be otherwise provided if the Association so desires.

DR. CARY: In construing that part of the By-Laws, that "otherwise provided" meant for other committees, not standing committees. If you put this through, you have to have an amendment to the By-Laws. Therefore I move that this recommendation be offered as an amendment and referred to the Executive Board for report next year.

(The motion was seconded by Dr. Adams and carried.)

SECRETARY MAYO: I have some telegrams I would like to read. I think the Association will be interested in them.

I sent a message of greeting to Dr. Archibald, a member of the Executive Board from the Sixth District, who is ill. He says: "Thanks for the kind wishes, and I hope you have a pleasant and profitable meeting."

I also received a message from Dr. Blattenberg, Lima, Ohio: "Why is mountain dew? Best wishes for good meeting." (Laughter.)

RÉPORT OF COMMITTEE ON INTELLIGENCE AND EDUCATION

PRESIDENT WHITE: Is the Committee on Intelligence and Education ready to report?

(Dr. Bergman read the report of the Committee on Intelligence and Education, as follows:)

During the past year twelve of the fourteen veterinary colleges in the United States and Canada approved by this Association have been visited by members of this committee, and in addition one college, the Georgia State College of Agriculture, Division of Veterinary Medicine, which is asking recognition this year as an approved institution. With two exceptions these institutions were visited while school was in session. In all cases the visiting members of the committee were courteously received, every assistance being given in carrying out the inspection and all requested information relative to entrance requirements, curricula, faculties, teaching methods, equipment, etc., freely furnished.

Data secured by the committee indicate that all veterinary colleges at present recognized by the Association are complying with the regulations relative to entrance requirements, length of curriculum and transfer of students. Relative to the latter, the Secretary has from time to time referred correspondence to the committee from various deans relative to questions of transfer of students from certain of the nonaccredited schools. Questions relative to the interpretation and enforcement of entrance requirements, status of Federal Board students and certain individual cases needing special consideration have been referred by various deans to the committee for suggestions, the attitude in all cases being to comply with the suggestions made.

Investigations of the various colleges this year showed, in a number of institutions, a marked improvement in general condition over last year, improvements varying from additional buildings and equipment to improvement of faculty personnel and general instructional methods. Several institutions have secured within the last year modern buildings which were badly needed, the aggregate value of which will total into several hundreds of thousands of dollars. The committee believes that it is not breaking faith in stating that the A. V. M. A. through its Committee on Intelligence and Education has by correspondence, recommendations and personal conference with college authorities been of considerable assistance to the deans in securing many of the above-mentioned improvements. Developments of the past year would seem to indicate that close cooperation between this committee and the deans of the various veterinary colleges can be made of considerable mutual benefit in securing needed improvements at the various schools, working ultimately for the betterment of the veterinary educational situation, which is the aim of the Association.

The future standing of the veterinary profession depends upon the educational standards it maintains. The foundation of the profession is its education. If the veterinary profession can not, or does not, maintain educational standards equivalent to those of other professions, then it can not expect to become permanently established on an equal plane with them.

It is the earnest desire of the committee to cooperate with the various veterinary colleges for the betterment of veterinary education. The attitude of the committee should be and is a cooperative and helpful one rather than strictly critical. It is not the intention to

injure or work a hardship on any educational institution by excessive demands, but rather request a reasonable standard of educational efficiency. As has been demonstrated in the past, the prestige of the A. V. M. A. can be of considerable assistance to the various schools in securing needed improvements.

During the past year the committee has had two meetings in Chicago, the first at the time of the Live Stock Sanitary Association meeting, to discuss the recommendations of the committee as approved at the Columbus meeting, hear subcommittee reports and outline future plans, and the second following the inspections of the various schools to discuss the general educational situation, outline suggestions to the various schools and plan the committee report for this year. Criticisms and suggestions which the committee believes of a constructive nature have been forwarded to the deans of various institutions and for the most part have been acknowledged and favorably received.

Considerable comment has been made in the veterinary press generally, the past two or three years, relative to the decrease in number of students attending veterinary colleges since the year 1916. The following tabulation shows a total of 870 students matriculated for the session 1920-21 in the fifteen veterinary colleges accredited by this Association. Of this number 187 were freshmen. In addition there were approximately 120 students attending colleges not accredited, or a total of 990 attending the veterinary colleges in the United States and Canada. This is approximately one-third the number attending the 23 veterinary colleges existing in 1916.

Numerous factors are responsible for this decline, the principal one undoubtedly being the increase in entrance requirements and length of curriculum. There are those who have become so alarmed over a shortage of veterinarians that they have advised lowering entrance requirements and the veterinary colleges again accepting any one unable to enter the other learned professions. This is certainly not the remedy. The remedy lies rather in increased publicity regarding the profession's attainments, better remuneration for service, better appropriations for veterinary colleges and veterinary research whereby veterinary education may assume a position on a par with the other professional and technical lines of work and be properly regarded and appreciated by the public. Our worthy president, Dr. White, summed up the situation in a few remarks in a recent address when he stated as follows:

"We are already far enough behind the entrance requirements of the other professions. We can not make progress by walking backwards. In the final outcome the matter will adjust itself. If in the next few years the number entering the profession is too small to meet the demand, the public will recognize the fact and we will again find our veterinary institutions filled."

Last year the Association approved a recommendation of this committee that it be empowered to outline what might be regarded as the "essentials of an approved veterinary college" and also a schedule whereby veterinary colleges might be graded and, if desirable, classified, and after submitting these to the Executive Board that the two bodies inaugurate the use of the same for the inspection of veterinary colleges during the year 1920-1921. In working out the suggested outlines the committee studied closely the general plan used by the Council on Medical Education of the American Medical Association and secured valuable cooperation from the secretary, Dr. N. P. Colwell. The matter of a schedule for grading and classifying veterinary colleges has been given considerable study by this committee; however, no plan is suggested or recommendations made at this time. The matter needs

STUDENT ATTENDANCE AT APPROVED VETERINARY COLLEGES, SESSION 1920-21.

Name of Institution	First Year	Second Year	Third Year	Fourth Year	Special	Total
Alabama Polytechnic Institute.....	20	15	12	6		53
Colorado Agricultural College.....	26	22	20	20		88
Georgia State Agricultural College ¹	7	7	3	4		21
Indiana Veterinary College.....	11	28	23	73	1	136
Iowa State College.....	30	24	18	22		94
Kansas State Agricultural College.....	9	20	13	18	1	61
Michigan Agricultural College.....	1	8	4	6		21
Universite de Montreal.....	12	4	4	6		26
New York State Veterinary College (Cornell).....	13	32	15	16	2	78
New York State Veterinary College (New York University).....	7	3	5	8		23
Ohio State University.....	19	30	30	25		104
Ontario Veterinary College (Toronto, Canada).....	28	32	22	17		99
University of Pennsylvania.....	4	8	7	11		30
Texas Agricultural and Mechanical College.....	1	5	2	6	4	18
State College of Washington.....	3	1	6	12		22
TOTAL.....	187	239	184	252	8	870

¹ Recommended for approval 1921.

further study, and it is probable that the cooperation of the deans of the various colleges will be requested at a future time to assist in the outlining of such a schedule. The following tentative outline of the essentials of an approved veterinary college has been prepared by this committee to serve as an aid in the inspection of veterinary colleges:

ESSENTIALS OF AN APPROVED VETERINARY COLLEGE

Entrance Requirements

1. The matriculation requirement of an approved veterinary college shall be not less than four years of high-school work or equivalent studies taken in other preparatory schools, provided that candidates for admission to approved veterinary schools who can not present a satisfactory certificate from the proper official of the school or schools attended covering the required amount of preparatory work may be admitted upon passing satisfactory examinations approved by the proper State educational officers.

Administration of Entrance Requirements

2. The admission of students to the veterinary school must be in the hands of a responsible committee or examiner, whose records shall always be open for inspection. Documentary evidence of the student's preliminary education should be obtained and kept on file. When the veterinary school is an integral part of a university, this work usually devolves on the university examiner. Unless the university examiner and his records are closely accessible, however, some officer at the veterinary school should obtain and keep on file documentary evidence of each student's preliminary education, including both high-school and collegiate work.

Advanced Standing

3. (a) Full advanced standing may be granted to students only for work done in other approved veterinary schools, and in granting advanced standing official verification of the student's previous veterinary work should be obtained by direct correspondence with the college previously attended, and his preliminary qualifications should also be verified and recorded the same as for freshman students.

(b) Advanced standing granted to students for work done in non-approved veterinary colleges should be strictly on the basis of exam-

inations in the particular subjects in which credit is desired. As in the case of students seeking full advanced standing, official verification of the student's previous veterinary work should be obtained and his preliminary qualifications should be verified and recorded.

Attendance

4. (a) The college should require that students be in actual attendance in the college within the first ten days of each session and thereafter.

(b) Actual attendance at classes should be insisted on except for good cause, such as for sickness, and no credit should be given for any course where the attendance has been less than 80 per cent of the full time.

Supervision

5. (a) There should be careful and intelligent supervision of the entire school by the dean or other executive officer who holds and has sufficient authority to carry out fair ideals of veterinary education as determined by the present-day knowledge of veterinary medicine.

(b) There should be a good system of records showing conveniently and in detail the credentials, attendance and grades of the students, by means of which an exact knowledge can be obtained regarding each student's work. Records should also be kept showing readily the attendance of students at hospital and ambulatory clinics.

Faculty

6. (a) The college should provide at least five thoroughly trained veterinarians in charge of major departments, salaried so that they may devote their entire time to instruction and to that research without which they can not well keep up with the rapid progress being made in their subjects. A sufficient number of assistant veterinarians should be provided to conduct the work properly, the number of the latter being governed by the number of students and amount of research work being conducted. In no case should a head of department be a veterinarian of less than five years' experience in his particular major subjects.

(b) The faculty should be made up of graduates of recognized veterinary colleges. Other than veterinarians should be selected as teachers of veterinary subjects only under exceptional circumstances and only when veterinarians of equal special capacity are not available. The faculty should be thoroughly organized with an executive head or dean and each department having its head professor directly responsible for all instruction given in his particular department.

Curriculum

7. (a) The college curriculum should be fully graded and extend over four collegiate years of not less than thirty-two weeks each and of not less than seventeen credit hours per week, exclusive of time required for matriculation and holidays. The courses offered in the various subjects should be set forth in the annual announcement, so as to show for each course its number, subject, content, character (lecture, recitation, laboratory or clinic), length of time devoted to each and the amount of credit allowed. The courses for each class should also be clearly set forth in a class schedule, for the guidance of the students.

(b) The college should give two years of work consisting largely of laboratory work in well-equipped laboratories of anatomy, histology, pathology, embryology, physiology, chemistry, bacteriology, pharmacology, therapeutics and clinical diagnosis. In addition selected animal husbandry subjects, such as breed types and judging of livestock, animal breeding and feeds and feeding, should be required.

Present-day knowledge makes it essential that these subjects be in charge of full-time, well-trained teachers.

(c) Two years of clinical work with courses in medicine, surgery (including surgical anatomy and operative surgery on experimental subjects), obstetrics, serum therapy, parasitology, sanitation, food hygiene and necroscopy.

General Teaching Facilities and Instruction

8. (a) The college should show evidences of thorough and reasonably modern instructional methods in all departments. Adequate classroom and laboratory facilities and such equipment as is generally regarded as being essential to the teaching of the various laboratory branches should be provided. Evidences should be shown that student work is being carefully supervised and that equipment and facilities are being intelligently used in the training of veterinary students.

(b) Each college should be supplied with such auxiliary equipment as projection and photographic apparatus, charts and other apparatus now so generally used in medical teaching.

(c) Modern experimental laboratory work in physiology, pharmacology, bacteriology, as well as for medical research, necessitates a supply of animals such as frogs, rabbits, guinea-pigs, etc., and proper provision is necessary for the housing and care of such animals.

(d) There should be sufficient embalmed material to enable each student to dissect the lateral half of the horse, ox, pig, sheep, dog, cat and fowl and to provide cross sections, special dissections and other demonstration material. Care should be used to provide material from both sexes of each species for simultaneous dissections and demonstrations. Pregnant and immature subjects for dissection are also helpful. In the case of the horse, at least, a living animal should be in the dissecting room for a "palpator."

(e) The college should have a working library, to include the more modern veterinary text and reference books together with related scientific text-books and journal files. The library should receive regularly the leading veterinary and related scientific periodicals, the current numbers of which should be in racks or on tables easily accessible to the students. At the end of each year these periodicals should be bound and added to the files of bound periodicals. The library room should be properly lighted and heated, and open during all or the greater part of the day.

(f) There should be a working museum having its various anatomical, surgical, obstetrical, pathological and other specimens carefully prepared, labeled and indexed so that any specimen may be easily found and employed for teaching purposes. It is suggested that so far as possible with each pathologic specimen coming from post-mortems there also be kept the record of the postmortem, the clinical history of the patient on which the postmortem was held and microscopic slides showing the minute structures of the diseases shown in the gross specimen. The museum furnishes an excellent means of correlating the work of the department of pathology with that of the clinical departments.

Clinical Facilities and Instruction

9. (a) The college should be provided with a clinic building or clinic rooms with facilities for receiving, recording, examining and treating medical and surgical cases of all species of animals. The building should contain a dispensary with drugs, instruments and instrument sterilizers; one or more operating rooms with operating tables for large and small animals; a clinic room for the examination and daily treatment of patients, and stalls and kennels for hospital patients.

(b) An average of not less than 100 cases per month, well dis-

tributed as to species, is desirable for senior classes of twenty-five students or less, these cases to be of such character as to permit the students to see and study the common variety of surgical and medical cases in each species.

(c) Clinical instruction should be offered to junior and senior students. The same cases may be used for both classes, each case being assigned to a senior student having one or more junior assistants. Each student group should be responsible for making a detailed examination of the patient assigned, assisting in the treatment, and making careful records of the case until it is discharged from the hospital. Where clinical material is limited the instructors should see that each student in the class has knowledge of each and every case, and students should be required to pass examinations in their clinical work as well as any other subject.

(d) Facilities should be provided for proper postmortems on animals dying in the clinics during each college session, which should be attended by both classes and participated in by senior students. These should be performed in cooperation with the professor of pathology.

(e) The clinical staff should include the professors of medicine and surgery and their assistants, and they should have the close cooperation of the professors of pathology and bacteriology. The examination of patients, the preparation of drugs and instruments should be under the close supervision of the instructors, and all treatment and operations should be done by the instructors assisted by the students assigned to the case. Attendance at the clinic should be prompt and regular on the part of students and instructors.

(f) An ambulatory clinic should be maintained for senior students under the direction of a good practitioner and instructor who is a regular member of the faculty. Students should be assigned to this work in small groups for definite periods, and the members of each group should go on all calls during their periods of assignment.

19. A clear statement of the college's requirements for admission, tuition, sessions, courses offered and graduation should be clearly set forth in regular annual catalogs or announcements.

In visiting the various colleges this year your committee has endeavored to apply the above outline as a basis for judging the work of the various institutions, and it has proven of material assistance in securing a greater degree of uniformity in the school inspections. No institution visited presented, of course, a condition of 100 per cent efficiency. As previously stated, certain institutions showed a marked improvement over their 1919-20 condition and have endeavored to carry out as far as possible previous suggestions and recommendations of this committee.

Last year at the Columbus meeting this Association approved of the principle of a publicity campaign the aim of which was to bring before the public some of the important phases of veterinary medicine in reference to the relation of the profession to public health, advancement in education, field and scope of work and its general relation to society. However, after careful consideration by this committee, in addition to conferences with the Executive Board, it was not deemed advisable, on account of lack of funds, to begin publicity work of this nature the past year. Recently the subject has again been brought to the attention of the profession through the editorial columns of one of our veterinary journals, wherein comment and suggestions are presented in connection with a discussion of a "News Service for Science" recently established in Washington, D. C., under the name of "Science Service." Science Service is the name of an agency newly established in Washington through the generosity of

Mr. Edward Scripps of Miramar, Calif., for the diffusion of knowledge regarding science. The governing board of fifteen trustees is composed of representatives of the National Academy of Sciences, the American Association for the Advancement of Science, the National Research Council, the Scripps Estate, and the journalistic profession. Its function is to serve all sciences, acting, as it were, as an ethical agent between scientific circles and the outside world, and through popular science writings instruct the people as a whole regarding the aims and achievements of the various branches of modern science. It would seem that this service might afford the means of giving to veterinary science and the veterinary profession a wider and more desirable publicity, and is worthy of investigation by this Association.

Summary

1. This committee recommends the following list of veterinary colleges as approved colleges for the ensuing year:

Alabama Polytechnic Institute, College of Veterinary Medicine.

Colorado State College, Division of Veterinary Medicine.

Georgia State College of Agriculture, Division of Veterinary Medicine.

Indiana Veterinary College.

Iowa State College, Division of Veterinary Medicine.

Kansas State Agricultural College, Division of Veterinary Medicine.

L'Ecole de Médecine Vétérinaire, Université de Montreal.

Michigan Agricultural College, Division of Veterinary Science.

New York State Veterinary College at Cornell University.

New York State Veterinary College at New York University.

Ohio State University, College of Veterinary Medicine.

Ontario Veterinary College, Toronto University.

State College of Washington, College of Veterinary Science.

Texas Agricultural and Mechanical College, School of Veterinary Medicine.

University of Pennsylvania, School of Veterinary Medicine.

2. This committee recommends that the "Essentials of an Approved Veterinary College" as herewith submitted be approved.

3. This committee recommends that this Association, through an authorized committee, investigate the newly organized "Science Service" as herein mentioned, and if advisable endeavor to have such educational publicity articles prepared as may properly give the profession wider publicity, and, following approval of the committee, be placed at the disposal of this science news agency for publication.

4. This committee recommends that, in order that sufficient funds may be available for the work of the Committee on Intelligence and Education to carry out properly its projected work, the Budget Committee, if it deems advisable, increase the appropriation for the work of this committee from \$1,000 to \$1,500 for the ensuing year.

CASSIUS WAY, *Chairman*

(Term expires 1922),

L. ENOS DAY

(Term expires 1921),

L. W. GOSS

(Term expires 1925),

B. T. SIMMS

(Term expires 1924),

H. D. BERGMAN, *Secretary*

(Term expires 1923),

Committee on Intelligence and Education.

PRESIDENT WHITE: You have heard the very excellent report of the Committee on Intelligence and Education. What shall be done with it?

DR. SISSON: I move that the report be adopted.

(The motion was seconded by Dr. Hoskins.)

DR. EICHHORN: There is one recommendation with regard to the heads of departments which I think ought to be amended. If I understand correctly, the statement was that the head of any department should require five years' experience in that particular branch. It seems to me that sometimes it might work to the disadvantage of a particular college if you adopt that. Have the time limit stated definitely. It might be that the professor in some veterinary college might be suited if there is a vacancy in some other department. If we adopt this, I don't think this could be accomplished, so I move that the committee change this particular clause.

PRESIDENT WHITE: Is this clause mandatory, Dr. Bergman?

DR. BERGMAN: It says "in no case *should* a department," etc. It is not mandatory.

PRESIDENT WHITE: The motion to accept the report is before you.

DR. R. C. MOORE: I would like to offer an amendment to the report: That the St. Joseph Veterinary College be considered in the accredited list of this Association.

(The motion was seconded by Dr. Conrad.)

DR. BERGMAN: If I understand Dr. Moore's motion correctly, it is that the St. Joseph Veterinary College be added to the list of approved veterinary colleges. This would seem to be a very extraordinary request on the part of Dr. Moore, as this committee has no information as to the condition of this veterinary college during the past year. St. Joseph Veterinary College was discredited at the New Orleans meeting and asked for re-examination the next year, and the committee, following the re-examination, recommended at Columbus that it remain on the discredited list. It does not seem that we should place on the approved list a college regarding the present condition of which we have no information.

DR. R. C. MOORE: I would like to explain the situation. Last year, when we were rejected at Columbus, a motion was made immediately asking that our institution be inspected again for future consideration. During the discussion on that question the Chair made the statement that it was unnecessary to adopt such a motion because our college would be regularly inspected in the rounds of inspections. We have depended upon that statement. We have waited day after day, throughout the year, expecting from time to time that this committee would visit us and inspect the institution. I even waited at home until the last train before I could reach this convention, thinking they might stop there on their way to the meeting, as most of them

lived beyond that point. They did not come. The fact that it has not been inspected is no fault of ours. We are meeting every requirement as read here today by the chairman of this committee. We have put in last year our full time as we did the year before, of thirty-two weeks of actual teaching time. We have taught every subject that is required. We have taught it as thoroughly, I believe, as any other school is doing. Our clinics have been good. In fact, the men who have graduated from that institution in the last year, I believe, particularly have demonstrated this fact, and they have passed your State boards wherever they have gone. Not a single failure has been reported this year.

We graduated thirty-seven men. We had a hundred students, and we did not admit a single man except on the high-school requirements as required by this Association, and we do not see why we should be discriminated against, and not be allowed the privilege of other members of this Association. The faculty and members of that institution are members of this Association. We have been members of this Association for a good many years. We have done our part as best we could for the upbuilding of this Association. We believe we have no right to be discriminated against because of no failure on our part.

We ask to be reinstated to the list of accredited colleges, and if we are found to be not living up to these conditions, we are willing to take the consequences. I ask you, gentlemen, to consider this carefully and not do an act that will ruin an institution that has labored year after year, and that will ruin the men at the head of the institution who had labored year after year for the upbuilding of the institutions of the country. I ask you to consider this carefully and vote as you think is right.

If we are discredited this year it means another hardship to maintain a sufficient number of students to meet our expenses. We did so last year, notwithstanding the fact that we received a stunning blow, and accusations were made against us, that somehow or other came to the committee, that were not correct.

I want to say one thing while I am on the floor. I am not saying this to discredit the committee, but to prove what I said. The statement was made at Columbus (that was one of the contentions of the committee) that we had admitted men to advanced standing who should not have been admitted. The chairman of the committee made the statement that we had admitted Edward Trenton Prends, who had come to us with credit for two years' work in the Iowa College, with a certificate on which was written "disqualified." I didn't believe it at the time. The man had been an elegant student, and the committee went on to say that this man was not bright. Where they got their information I do not know. I have in my pocket a photograph of that certificate. It is here for your inspection. Not a single line of any description is written across its face. Down

in the corner, however, is written: "Letter of honorable dismissal hereunto attached."

I have the letter here, which reads as follows:

"To Whom It May Concern: This is to certify that Edward Trenton Prends is this day at his own request granted this testimony of honorable dismissal, September 14, 1918." It is signed by the registrar.

They didn't stop with that. It seemed that they liked him.

"Mr. Trenton Prends, Moulton, Iowa. My dear Mr. Prends: Replying to yours of the 1st instant, we are inclosing herewith certificate of your credit with letter of honorable dismissal. We are sorry to lose you from our student enrollment and hope you will enjoy your work wherever you decide to register, and that you will return to Iowa State College later to finish your course."

I admitted this man on these credentials, and I believe I did right. I believe they are as clear as can be, and I am reading you this to show you that this committee has been misinformed from some source or other. I believe it was an injustice to this man to make a statement of this kind. That is the reason I am reading this and showing these documents here for your consideration:

I again ask you to give this your careful consideration.

DR. BERGMAN: Mr. Chairman, one might think from the latter part of Dr. Moore's discussion that his institution was refused recognition because of this particular case (Trenton Prends). If this committee made a mistake in the examination of the credentials of one student, that would not be remarkable, because when you go into an institution and commence to examine the credentials of the students, it is quite a complicated task. At the New Orleans meeting the criticism particularly emphasized was the matter of matriculation requirements, because at the meeting in New Orleans, when the St. Joseph School was first discredited, it had failed to meet the matriculation requirements laid down by the Association relative to four years' high school, and there was no use of further discussion. Neither had the requirements been met at the time of the Columbus meeting, for the school had not yet opened for the season of 1920-21.

In addition, however, the objections of the committee to the St. Joseph School went further—namely, that there was a lack of proper facilities to carry out efficient veterinary educational work. So far as this individual instance that Dr. Moore brings up is concerned, if the committee owes an apology for that, all well and good. Don't think, however, that this individual instance was responsible for the discrediting of the St. Joseph Veterinary College. The committee recommended that the St. Joseph Veterinary College be discredited largely in view of the fact that in the opinion of the committee it was not carry-

ing out efficient educational methods and did not have the facilities to do so.

Relative to the inspection of the St. Joseph College this year, if the committee had had any idea that it desired inspection, it would have been given. The committee was not requested to inspect the college by the college authorities, neither was it instructed by the Association to inspect the college.

The committee discussed the case of the St. Joseph Veterinary College at the meeting in Chicago in December, and it was agreed that inasmuch as we had not been requested to do so, we would not inspect the college. Do you suppose for a minute that this committee would walk into an institution over which the Association has no jurisdiction and inspect it without being requested to do so? If we had been requested to inspect the St. Joseph Veterinary College we would have done so. As a matter of fact we heard reports to the effect that it was immaterial to the college whether it was recognized by this Association or not.

We sincerely hope, as the committee is directly responsible, that this Association will not see fit to approve this college without definite information as to its present condition and educational methods being employed.

DR. CAHILL: Last year we asked for a committee to investigate this college at once that we might be put upon the accredited list. The Secretary at that time made the remark that he would fight with every power available the appointment of a special committee or a visitation of the regular committee to this school at that time, saying at the time that this would be investigated and looked after during the regular visitations. Dr. Cary in his remarks said that this school would be visited by the regular committee during the course of the year. We not only asked for this committee to investigate us, but we tried to get a special committee or this committee to make a special trip to investigate us, and did not succeed. It seems strange to me that in the face of that evidence this committee will come before you here and say that they had not received an application from this college to visit it.

During the year we have endeavored to keep up the high standard of the school as it has been in the past. The statement was made that the college was lacking in certain essentials. I would refer the Doctor to the previous report of the previous committee, which complimented us upon our laboratory facilities and the manner in which the work was conducted. No change had been made during the time. It is strange that two committees would differ to that extent.

We waited until last Sunday for this committee. It is no fault of ours. If this convention thinks it is fair to this school that we should stay on the discredited list for another year on account of a mistake of this committee, it is up to you. We ask for nothing but justice. (Applause.)

DR. CONRAD: It has been my pleasure and privilege to be in close proximity to this college. I live a short distance out of this city. I will state plainly I never had any request to visit this college. I go to St. Joseph frequently, and invariably loiter around and visit the college and visit the classes. I am a member of the State Veterinary Board in Kansas, having been appointed this last year. I looked over the papers of the graduate members of the class, and I must say, in highest regard, they passed better examinations than I ever had the privilege of reading from any college or any institution.

I am not saying this on account of any friendship I have for the college, the professors, or anything of that sort. This talk I give you comes unsolicited. I talked with Dr. Luckey, of the Examining Board of Missouri, and every man passed the examination. I had the opportunity of perusing some of the questions asked this class, and I will state that it was a very severe examination. They gave a real examination. We gave one entirely different, but covered the subjects in completeness, and the men from St. Joseph passed a very creditable examination. Dr. Wolfe was president of the board, and he said, "We have to give St. Joseph a handclap for the manner of their educating their students in this college." (Applause.)

DR. R. C. MOORE: I would like to call attention of the Association to the fact that Dr. Bergman seems to think it would be improper to accredit this college without the recommendation of the Committee on Intelligence and Education. I just want to remark that we were discredited in New Orleans in face of the fact that the committee not only recommended us favorably, but the chairman of the committee stood before the Association and pleaded for our continuance on that list. Yet you took it out of the committee's hands and voted us out. Is it any more harm to vote us in without the recommendation of the committee than it was to vote us out? (Applause.)

DR. GRAEFE: I happened to be present at the Columbus meeting last year, and think I understand the proceedings in reference to this question. I would take it to mean that that institution at that time was promised consideration and inspection during the ensuing year. I have been in the office of the St. Joseph Veterinary College once. I have never been through the institution, and know nothing about their equipment or any of the other circumstances in question, but it does seem to me like an injustice that when these matters are brought so forcibly before this Association, the Committee on Intelligence and Education did not take the means to be able to know something about this institution when this question was brought up at this time.

I don't know what the Constitution and By-Laws say in reference to that matter, but it seems to me if we want to conduct efficiently the aggressiveness of veterinary education in this country, when there is one institution in question, as this one

has been, that the mere matter of the formal request, whether given or not, should not be justification for keeping this institution on or off the accredited list, if it is entitled to be on it. It seems to me as though it is a matter of justice and justice only, and one which, if not given at this time, is going to delay that institution another year, which is a very vital factor in its management. I don't want to be responsible for any sentiments to lower the educational standards, but I do feel that the interest of the veterinary profession in this country demands that every institution in this country be given justice. (Applause.)

DR. SIMMS: As a member of the Committee on Intelligence and Education I beg to call attention to the happenings at Columbus last year. The St. Joseph Veterinary College did not request on the floor at Columbus that we inspect the institution this year, but where the request came in was in a motion from Dr. Koen, asking that the Committee be instructed to inspect, with power to put the institution back on the list of accredited colleges without referring back to this Association. The request was a motion asking that our committee be given power to act. The motion was lost, Dr. Mayo stating, as has been said, that he would fight very much any motion or movement to give the committee power to act without referring back to the Association as a whole. That was the only request that we received, that request coming, as I say, from Dr. Koen in form of a motion, which the house as a whole voted down. There has been some little discussion of what took place there, and I wanted to call attention of all the members present to what happened there. I have looked up the minutes of the previous meeting. (Applause.)

DR. P. A. FISH: There seems to be a question of veracity involved, and that, perhaps, can not be settled at this meeting. I was at the New Orleans meeting and remember when this question came up for discussion. The requirements for the accredited list were published in advance, and the private schools had a meeting to talk over the future and discuss whether or not they should comply with these requirements. As a result of that meeting certain of the schools did comply with the requirements and were recognized and accepted by the Association. The St. Joseph School did not comply with the requirements at that time, and yet a very earnest plea was put up at the New Orleans meeting for it to be taken in on the accredited list just the same. That brought up the question of fair play. Is it right to penalize an institution that did comply with the requirements, although much hardship was involved, and overlook the negligence or possibly the defiance of another school that failed to take the proper action? I think that was the question at issue. Nobody who intends to do justice in connection with this matter would be willing to take this school into the Association without any examination. The committee has been appointed for the

very purpose of looking over the equipment of the schools. It is their function to know about these things, and their opinion is more valuable to the Association than that of parties directly interested in the school, because their opinions are naturally more or less biased.

I think the Association should stand by its committee. I think we should be guided very largely by what they have to say. It is unfortunate that the committee has not been asked to visit the school before this time. It is difficult for the layman in the Association to judge, but the issue now seems to be whether the school shall come into the Association on the statement of its dean or whether it shall come in in the proper way, by recommendation of the committee.

DR. CONRAD: In the face of the remarks the gentleman just made, I would offer an amendment to the amendment, which is contrary to the motion, that three additional members be added to the committee, to make immediate investigation of the St. Joseph Veterinary College, and if their findings are such that it is an accredited college, that it be immediately published and recommended.

(The motion was seconded by Dr. Connaway.)

DR. STANGE: I rise to a point of order. I think that amendment is unconstitutional. The Constitution provides for the Committee on Intelligence and Education and its personnel. Any committee that would be appointed to investigate this institution would have to be a special committee or a committee to cooperate with this committee.

PRESIDENT WHITE: The Chair sustains the point of order.

DR. CONRAD: I make a motion to amend the amendment, that the Committee on Intelligence and Education be asked to inspect immediately the institution and immediately report to the Association. (Seconded.)

DR. BERGMAN: This committee is to report to the Association annually. We can not report until the next annual meeting of this Association. We shall be very glad to make the inspection upon request.

PRESIDENT WHITE: Is there any further discussion?

DR. SISSON: It seems to me this last motion is unnecessary. It can't be amended.

DR. CONRAD: In view of the fact that you give complete power and usually do according to the recommendation of the committee, it seems to me that we have held this in suspension long enough; that this college should be either recognized or disqualified forever, and it is a discrimination to keep this college out if it is complying with the requirements which establish a good college. We should act in some manner according to technicality of some kind. This college deserves looking into.

PRESIDENT WHITE: An amendment to an amendment must be germane. The Chair will rule the amendment to the amend-

ment out of order because it is not germane. The question resolves upon the amendment to the motion. The amendment is to add the St. Joseph Veterinary College to the list of accredited colleges of the Committee on Intelligence and Education.

DR. KOEN: It is with much reluctance that I rise to speak on this question. For days an effort has been made to prevent just this situation, and just before entering this room with this committee some effort was made whereby a solution might be had without a rehashing of everything that has transpired. The reason for this effort was the benefit of the Association, the prevention of further ill will, the accomplishment of justice toward all. The suggestion at that time was that an application be made at this time for an immediate investigation by the Committee on Intelligence and Education, of the St. Joseph Veterinary College, to determine whether or not it was meeting the requirements. It was also suggested that the Intelligence Committee, in order to show that it bore no ill will and no grudge and did not intend to discriminate against the St. Joseph School, request of this Association that the chairman appoint three other members of the Association to accompany that committee to make this investigation. It is not the desire, I am sure, that the Committee on Intelligence and Education be discredited, and I do not believe that it is the desire of this Association that the St. Joseph Veterinary School be discriminated against if it has been meeting the requirements.

I regret that the motion by Dr. Conrad was not made in a little different form. I don't know that it could be made so as to be considered germane by the chairman, but if it were possible for a motion to be made that the rules and By-Laws be suspended, and that three additional members of this Association supplement the Intelligence Committee for immediate investigation, and that their findings be published in the *JOURNAL*, surely then the credit should be due the St. Joseph Veterinary College and no injustice would be done; neither would the Association be on record as supporting something that would be unfair.

I make this statement since I have been mentioned by Dr. Simms (he quoted me correctly), and I think it is just that you know what has been attempted.

DR. CONNAWAY: We had a President once who said in a great crisis that it is not a theory but a condition which we confront, and the condition that confronts us now in this country is a shortage of veterinarians. You all know that I have always stood up for high standards. I would put the Cornell graduate or the State college graduate in every county in this whole country, if I could, or some of these other good schools; but we have in Missouri, where this school is located, twenty-five counties that have no veterinarians. Those people need veterinary service. I, from my college, have to teach county agents and extension men some veterinary knowledge so that they can give

these people veterinary service. Not very long ago I wrote to Dr. Moore, "Have you a good man you could send to Versailles, in Morgan County?" He wrote back that he didn't have him. If I had written to Iowa, Cornell, Pennsylvania, or any other place, I am sure I couldn't have gotten him there.

I am not in favor of this body here going over a regularly established committee and voting this school in, but I believe it is justice to this school that we should provide some means by which they can establish their qualifications to the satisfaction of this Association that they are meeting these requirements. I don't believe that we ought to let them in one minute sooner than they meet the full requirements of this Association, and I believe they ought to come in through the regular channels, not through any sympathy that we may arouse here on account of injustice or misunderstanding.

Therefore I renew the motion that the committee be instructed to inspect this school at the very earliest moment possible, and that they be empowered by this body to admit it back into regular standing, or reject, as may be the case.

If this body here can vote that school in, it certainly has the power to give that same power to that committee. If we don't stand by our committees we had better not have the committees. That is my stand on this matter.

I hope to see this school reinstated; I hope to see it come up to the full requirement of this Association. If we had the means at our universities to do this work, we would do it; but you know that it takes a lot of money to run a great institution like a university. It has a large number of departments. We need a large amount of money for running what we have, and if we can have a little help for running institutions and those located here and there over the country, we would be glad to have some. Send us good veterinarians. We need them. We have a good field for them. (Applause.)

DR. COTTON: I wish to second Dr. Connaway's amendment. Provided you don't consider that germane, I want to request Dr. Moore to withdraw his motion.

PRESIDENT WHITE: Dr. Moore, do you wish to withdraw your motion, your amendment, with the consent of the second?

DR. R. C. MOORE: We are now within a very few days of the opening of the school, and the only advantage that this school could gain this year by recognition would have to come within that space of time. I can see no advantage to us in any way for inspection to be made, because the time will be past to visit us with any benefit this year. If we wait another year we might as well wait regular order. Therefore I would not like to withdraw the motion.

PRESIDENT WHITE: The Chair will rule the motion of Dr. Connaway out of order.

SECRETARY MAYO: It doesn't seem to me that this Association

can do otherwise than follow the Constitution and By-Laws. I would like to ask Dr. Moore a question. I confess I don't see how the committee can inspect the school when it isn't running. Suppose, Dr. Moore, as soon as you get fairly started you asked the Committee on Intelligence and Education to visit your school, and if they find on inspection that you are meeting the requirements of the A. V. M. A., if the committee would report that finding to the JOURNAL of the Association, and it should be published, would that meet your needs? It wouldn't be official action by this body, because that could not take place until the annual meeting; but I believe the Association would approve the report of the Committee on Intelligence and Education. That is only my personal opinion. You have already advertised your school, preparing to open the next session, and I confess I don't see how recognizing that school now will be of any benefit to you at all; but I believe it would be a source of satisfaction to your students to know that the school had been inspected after it is running, and that the report of the committee was favorable. Of course, that would still be subject to the action of the Association, and then the students would know that this school will be recognized. It seems to me that that is the only solution of this problem as it is presented to us today.

DR. R. C. MOORE: Dr. Mayo, just as I stated a few minutes ago, it would be too late to be of value to us. A few men are waiting anxiously to know whether they will matriculate with us or not. They want to, but want to know whether they are to be recognized. This would be too late to be of value to them, and the period of matriculation will have gone by. It would be of no benefit to us whatever. If it has to come to that, we might just as well wait until the next year, and take the regular inspection. I can't see where it would benefit us at all.

(The amendment offered by Dr. Moore, that the St. Joseph Veterinary College be added to the accredited list of the Association, was put to a vote and was lost.)

PRESIDENT WHITE: The question now comes on the original motion to adopt the report of the Committee on Intelligence and Education.

(The motion was carried.)

DR. BERGMAN: This committee has another resolution that it would like to present.

(Dr. Bergman read the following resolution:)

Supplementary Report

The Committee on Intelligence and Education desires to submit, with its approval, the following:

We, the undersigned, hereby recommend the Honorable J. M. Whittlesey, Commissioner of Domestic Animals of the State of Connecticut, for election to honorary membership in the A. V. M. A.

Mr. Whittlesey from the time of his appointment has recognized the necessity and the advantages of cooperating with the veterinarians in his field of endeavor. In his official capacity he has at all times given

hearty and full support to the veterinary profession of his State and nation. Soon after his inauguration into office he appointed a veterinarian as Deputy Commissioner. The splendid progress in the control and eradication of infectious diseases in Connecticut is largely due to his sympathetic efforts and to the hearty support he always tenders to the veterinarians.

J. R. MOHLER,
T. E. MUNCE,
ADOLPH EICHHORN.

DR. KIERNAN: I take pleasure in moving that the report of the committee be accepted.

(The motion was seconded and carried.)

COMMISSIONER J. M. WHITTLESEY: Mr. President, I rise very humbly and unworthily to thank this great Association for the honor conferred upon me, and I shall guard that honor very loyally. I wish to reiterate that there may be no misunderstanding, that I am unworthy of this honor that has come to me unsought and as a great surprise. You have, in adding my name to your list of honorary members, honored Dr. Charles L. Colton, a member of your Association, for his four faithful years in the service of the State as Deputy Commissioner on Domestic Animals. You have honored the present deputy, Dr. George E. Corwin, also a member of the American Veterinary Medical Association. You are honoring that good, efficient association, the Connecticut Veterinary Medical Association, who have rallied around the Commissioner's office as their own department, and who have, with the cooperation and assistance of the Bureau of Animal Industry, with the assistance of Dr. R. L. Smith, inspector in charge, accomplished a wonderfully good work in Connecticut in the past four years. These accomplishments have been recognized by the Public Health Service of the State and the boards of health of the various cities, and have assisted in obtaining the confidence of the Legislature of the State of Connecticut. I do thank you from the bottom of my heart. (Applause.)

REPORT OF EXECUTIVE BOARD

SECRETARY MAYO: If it is permissible, I would like to go back to the report of the Executive Board. I have one short thing to report. The Executive Committee recommends that a Committee on Membership be appointed, this committee to consist of the incoming President, the Editor of the JOURNAL, the Secretary, and the Chairman of the Executive Board.

(It was voted, on motion, duly seconded, that the recommendation of the Executive Board be adopted.)

SECRETARY MAYO: There is one item of unfinished business that I want to get finished. At the last meeting of the Association a change of Article 12, Section 1, was proposed, changing the name of the Section on Veterinary Colleges and Examin-

ing Boards to Section on Education and Research. I move that that change in the Constitution and By-Laws be made.

(The motion was seconded by Dr. Hoskins and carried.)

PRESENTATION OF PAPERS

PRESIDENT WHITE: We have for this afternoon two papers to be presented. I will call for the paper on "The Need of Cooperation Between the United States and Mexico for the Control of Epizootics," by Dr. Luis Santa Maria of Mexico. Dr. Santa Maria has requested, inasmuch as he does not speak English fluently, that Dr. C. E. Troy of New Mexico read the paper for him.

(Dr. Bemis took the chair at this point.)

(Dr. Troy read the paper of Dr. Santa Maria. It was published in the JOURNAL for December, 1921, page 306.)

CHAIRMAN BEMIS: Gentlemen, you have heard this interesting paper. I am sure you all realize the importance of cooperation between these two countries in the matter of disease control. Do you wish to discuss this paper?

DR. EICHHORN: The paper presented a great deal of interesting material. Inasmuch as a colleague from Mexico has presented for the first time a paper before this Association, I would suggest that Dr. Santa Maria be taken to the platform and introduced to the audience. (Applause.)

(Dr. Santa Maria was escorted to the platform.)

DR. SANTA MARIA: I want to thank you for your welcome. On account of not being able to speak English fluently to express my sentiments to you, I asked Dr. Troy to deliver the address I prepared. (Applause.)

DR. ELIASON: I think it would be too bad to let this opportunity go by without an appreciation of the paper just rendered by our friend from Mexico. As a representative of one of the States that has sent our sister republic a considerable number of cattle, I wish to give him the assurance that we are doing everything we can, and will render him every assistance in our power to do those things which he wishes to have done. (Applause.)

CHAIRMAN BEMIS: We have one other paper on the program in the general session this afternoon, "The Surgical Treatment of Laryngoplegia in the Horse," by Dr. J. W. Adams. (Applause.)

(Dr. Adams read his paper. It was published in the JOURNAL for November, 1921, page 144.)

(President White resumed the Chair.)

PLACE OF NEXT MEETING

SECRETARY MAYO: I have invitations to hold the next meeting in New York City, Atlantic City, San Francisco, Cincinnati, and also an invitation that will be presented from St. Louis, and

there is an invitation from Madison, Wisconsin, which you have heard.

DR. MCKENNA: May I ask from whom the invitation from San Francisco comes?

SECRETARY MAYO: From the Convention Board of San Francisco.

DR. MCKENNA: I might say that the veterinarians of California do not believe the meeting should come west at this time.

SECRETARY MAYO: All of these invitations have come from chambers of commerce.

DR. JENSEN: In view of the statement made by Dr. Mayo that all these invitations have originated from chambers of commerce, I desire to say that several weeks ago it was my pleasure to visit the meeting of Wisconsin veterinarians. While this meeting was in session the question of inviting this Association to Wisconsin for the next year was taken up. In view of the fact that this is one of the largest dairy States of the Union, that they have never had the A. V. M. A., and there is a movement to have this meeting come there, I think they are entitled to have the meeting. Madison is a pretty good town; next to St. Joseph it is all right.

In view of the further fact that this meeting constitutes for most of us our annual vacation, we should also select a place where we can vacate pleasantly for a little while. I don't know where you could find more beautiful forests, or more beautiful lakes, than you can find in the State of Wisconsin—and there is water in them, too. (Laughter.) There is a bath with every room. All you have to do is put on your bathing suit and step out.

Furthermore, the University of Wisconsin is located there. It is one of the greatest institutions of learning in this country. It has offered this Association its buildings to use while we are there, and the Animal Husbandry Department has offered its buildings for clinics, something that has been lost track of in the last two years. We have confined ourselves to papers and discussions, and a great many men are still interested in surgery, while perhaps it doesn't seem to be called for as much as it was in years gone by.

There is a question of good fellowship involved. Almost every State in the Union has had this meeting. Although this Association has been in existence fifty-eight years, it has never gone to Wisconsin. They ask you to come there next year.

SECRETARY MAYO: In connection with this invitation, I should present the following resolution that was adopted by the Illinois Veterinary Association:

WHEREAS, St. Louis is centrally located in the Mississippi Valley, reached by twenty-six different railroads and fully equipped to accommodate and entertain a large body of visitors,

Be It Resolved, By the Illinois State Veterinary Medical Association, in regular session assembled, that we endorse St. Louis as the meeting place of the American Veterinary Medical Association in 1922, and

Be It Further Resolved, That we, as an association and individually, use our influence to accomplish this end, and

Be It Still Further Resolved, That a copy of this resolution be spread upon the minutes of the association and a copy forwarded to the National Secretary of the A. V. M. A., and by him brought before the proper authorities at the Denver meeting.

MR. HATFIELD (St. Louis): May I have the courtesy of the floor for a few minutes to speak for St. Louis? In addition to the resolution passed by Illinois (I apologize for not being here Tuesday) I want to call your attention to a few things.

Everything that Madison has said is right. There are some things which no city can give—which I expect to prove to you—as well as St. Louis. I want to call your attention to that so I may have the foundation laid properly.

I am going to present to the Secretary the formal invitation. Here is one from the St. Louis Publicity Convention Bureau. With the exception of Detroit, which has a fine bureau with a manager, the Convention Bureau of St. Louis is the only one of its kind in the world. We were kicked out of the Chamber of Commerce because it was taking 25 per cent of the income to run us. A group of men connected with the Chamber of Commerce organized this bureau, and I took hold of it and have built it up until we have an income of \$750,000 and sixteen people on the staff. My publicity man is Capt. Tourron, who made himself famous because of his success in breaking the record of recruiting U. S. Marines. I am paying that boy \$4,000 a year to get publicity. I have an expert man who does nothing but arrange details; he is a high-priced man.

Here I have the invitation of Governor Hyde of Missouri, in which he invites you to come to the State of Missouri. I have an invitation from the Mayor of the city, Mayor Kiel, setting forth its central location and accessibility. I have a letter here from the Chamber of Commerce, the Associated Retailers, and the Advertising Club, guaranteeing publicity. Those are formal invitations. I have some telegrams here which I will read. One is from Dr. Jenneman, another from Dr. Huggins, who is the veterinarian for the St. Louis National Stock Yards.

(Mr. Hatfield read the telegrams.)

I see here a group of men that ought to be ten times as big as it is. When you go to extreme points in the country a great many can not attend. Denver has wonderful weather, wonderful hospitality, they know how to entertain, and they have the mountains. We can't move the mountains to St. Louis. I am not making any invidious comparisons, but if you watch the

thermometer you will find that the thermometer of St. Louis has run from two to three degrees less than Chicago and other cities around there. It costs money in these times to travel. With the railroad rates up you want to get a central point which does not take so much money. We have had 369 conventions whose attendance we have increased from 25 to 30 per cent because they selected a central city.

The one thing I want to emphasize is our ability to take care of you. Pardon the personal reference, but I am President of the National Association of Convention Bureaus. I know what other cities are contending with in regard to conventions; they try to pattern as much as they can after our service. It is one thing to invite a convention to a city and quite another to have them all go away feeling that was the best convention they ever had.

Dr. Howard wrote me a letter and made the statement that they did not expect to have such service and such publicity anywhere until they came back to St. Louis in sixteen years. It was with his letter that I was successful in landing the American Bar Association.

Speaking of conventions, you know how careful the A. M. A. is. After four years I finally landed them. They are going to meet in St. Louis in the spring, in the last week in May.

We are taking care of conventions by giving a service that is twofold, first to build the attendance. I will spend any amount of money that your national officers will tell me is justified to build this attendance and get you new blood. I have met some of the fellows around here who are professional. I don't mean to criticize them. They are here representing other than what I would call the practitioners. It is all Greek to me, yet I hear a wonderful paper read here with less than a hundred people sitting here to listen to it. It is spread out through the technical journal.

To go back to the building up of attendance, we lay out a campaign after your formal notice has gone out to your members announcing where you have decided to hold your meeting, and we start in, subject to the approval of every word, so it will be ethical according to your standards. The Governor writes a letter on his stationery, we pay the postage, and it goes out of our office. We work that so that we may have series of a half dozen. We send those letters out to members and men who have not been to conventions for several years. The man gets a letter from the Governor of Missouri; that attracts his attention. A little later on he gets a letter from the Mayor, then from the Chamber of Commerce, then a local society, perhaps the stock yards. The psychology is really this: "Those fellows really want me! I am going to go!" Our publicity man will prepare cuts and material to go into your JOURNAL

and other official publications several months before the convention, telling all about it.

You are not going to be overcharged in St. Louis. The hotels are the Statler, Jefferson, Planters, Marquette, etc. We whipped the hotels into line, and if one of them goes back on its promise not to advance rates during conventions, they don't get any more conventions until they make good.

(Mr. Hatfield read telegrams from the Hotels Planters, Jefferson, Claridge and Marquette.)

I want to emphasize that we have the service, we will give the publicity. Our publicity is ethical. Suppose we had your program a month or six weeks in advance, and saw that Dr. Smith of Atlanta, for instance, was going to read a paper. We would try to get from Dr. Smith a paragraph or two on what he was going to say. If you paid for all this publicity it would cost you a million dollars, a dollar a line, which is cheap publicity. Here you are, a constructive organization with wonderful ideas to sell; you want new members, new blood; you want to sell the idea of your organization to the public. We arrange a press room, and Capt. Tourron secures the papers from you, as far in advance as you can furnish them, and commences to put them through. You will censor it, of course. We will see that anything you release gets into the papers. The manager of every daily paper is a member of this bureau.

I do want to say a word about the ladies. You haven't enough ladies here. We have in St. Louis an organization headed by a lady who is the hospitality director and meets with local ladies and arranges the program of entertainment. If you bring the ladies you won't have to worry; your wives will be taken care of. (Applause.)

PRESIDENT WHITE: You have heard the invitation from the city of St. Louis. Are there any more representatives of any other cities who would like to be heard?

DR. JENSEN: We are invited to go to St. Louis. We haven't had a single veterinarian from St. Louis at a convention in some time. Mr. Hatfield has come directly from headquarters to invite you, and he spent money in coming. It would be a good thing to go there and stir up those veterinarians.

DR. ELIASON: I am afraid that it is useless to talk to this audience after it has been subjected to that much oratory. We don't come here inviting you to come to Madison entirely for selfish motives. We believe that we can do something for the organization. If I didn't honestly believe that I wouldn't ask you to come. I can't boast of the terribly extravagant accommodations that we can give you; I can't boast of a good many elaborate times we can give you; but I guarantee you this, if you come there; You will all have to work and get into the meeting, and feel, when you go back, that you have been to a real veterinary convention.

We assure you that if you come to Madison you will be taken care of and housed, and it will be at rates that any one can afford to live on. There will be no seven or eight-dollar-a-day hotels, but we will take care of you and we will give you accommodation that will amply house you and keep you comfortable while you are there.

DR. CONNAWAY: In talking these matters over with Dr. Jensen at the beginning of this meeting I felt somewhat as he did; but the presentation which Mr. Hatfield has made convinces me that for the best interest of our Association we ought to go to some place where we can get the very largest attendance and have that cooperation of a publicity man who will make it a success. With all the promises which Mr. Hatfield has made, and with his genius for getting crowds to St. Louis, I believe that we would have in that city next year one of the largest attendances we have ever had. Moreover, it would be close to where Dr. Kinsley would be, so he could cooperate, and where every other veterinarian that should have been here can be drafted into the service and made to work harder than any veterinarian ever worked before. We need more members.

DR. CRAIG: I move that the Association recommend to the Executive Board that we meet in Madison, Wisconsin.

(The motion was seconded by Dr. Bergman.)

DR. LOCKHART: Strike out the word "Madison" and substitute "St. Louis." I move to amend to that effect.

(The amendment was seconded.)

DR. CONNAWAY: I would move as a substitute that the house be divided and those in favor of Madison gather on one side and those in favor of St. Louis gather on the other side.

PRESIDENT WHITE: That is a good suggestion.

SECRETARY MAYO: I think that matter ought to be referred to the Executive Board with an expression of opinion. I am not a member of the Executive Board, but I am sure the Executive Board would take every factor into consideration and give it the most careful thought. They represent the country as a whole.

DR. STANGE: The most representative committee we have is elected by postal card ballot for a period of five years, and it seems to me that if we are going to follow the policy of letting small minority groups decide these questions we are going to have a hard time doing for the Association what we want to do.

DR. JAKEMAN: Is not this motion merely a recommendation to the Executive Board? Is it not in their hands finally to decide?

PRESIDENT WHITE: The Chair so understands.

DR. JENSEN: I don't believe I got that understanding from the minutes yesterday. Has it come to pass that this entire organization is destined to be handled by five men? Is the entire membership that is paying dues entitled to know what shall happen? I declare to you that executive committees are human and they make mistakes. They ought not to take the

privilege of the membership out of their hands and put it into the hands of a committee of five men. I have had some experience with the Executive Board. I had to go on the floor to fight a bunch, and I want to tell you I beat them hands down. I would not for one minute submit to the final vote of the Executive Board on the matter.

DR. CONNAWAY: In making my motion it was my understanding that the settlement of this should ultimately go to the Executive Board.

(Dr. Connaway's substitute motion was seconded and carried, and a standing vote was taken on each city. The result as announced by Secretary Mayo was 40 in favor of St. Louis and 46 in favor of Madison.)

SECRETARY MAYO: As I understand this, it is referred to the Executive Board as the expression of opinion, 46 being in favor of Madison and 40 in favor of St. Louis.

DR. JENSEN: May I ask the Secretary to read for the assembled people, as a matter of courtesy to them, the exact wording of that matter in the By-Laws?

(Secretary Mayo read the section in the By-Laws.)

DR. CONNAWAY: My intention was to get the expression of this small body. There are so few of us here to represent such a large body and to say where we should go, that my intention was that the ultimate settlement should be left with the Executive Board. Things may come up between now and the next meeting that would place the meeting in some other location altogether. What we want to work for is not for local interests, not for the boosting of Missouri or Wisconsin, but to do those things which will be for the best interests of our Association. We want to do those things that are going to increase our membership. The Secretary has called attention to that time and time again. That is what we need. We should go where we will derive the most benefit. If we can get it by going to Madison, by all means let us go there. If we can get it by going to St. Louis, let us go there. I think some central location where there is some big booster like this one who will go after every section of the country may be of help to us. Maybe Mr. Hatfield will help us even if it goes to Wisconsin.

MR. HATFIELD: Surely.

DR. JENSEN: Let us not hedge the issue. I should think that in all fairness we should consider only our own best interests. I want to be fair, even though you may think I am knocking my own State.

DR. SIMMS: At a recent joint meeting of the British Columbia Veterinary Association and the Oregon State Veterinary Association, a resolution was unanimously passed inviting the A. V. M. A. to meet in Portland, Oregon, in 1925. In that year there will be at Portland an international exposition, so we can get very favorable railroad rates. We feel we are due some con-

sideration from the Association. We have a good many members of the A. V. M. A. out in the Far West country, and the Association has never met in that section. Somebody will mention San Francisco, but the people north of that, miles and miles away, do not feel that you are meeting in their vicinity. Get up to British Columbia. We have good loyal members in those Northwest States, members who pay their dues and boost the Association. We have never had a meeting anywhere in our vicinity, and we are extending at this time an invitation coming not from the commercial clubs, not from the hotels, but from the veterinarians of the Northwest, who hope you may be able to get up there in 1925. (Applause.)

Adjournment.

FRIDAY MORNING, SEPTEMBER 9, 1921

GENERAL SESSION

The meeting convened at 10:30 a. m., President David S. White presiding.

REPORT OF EXECUTIVE BOARD

PRESIDENT WHITE: We will now have the report of the Executive Board.

SECRETARY MAYO: Mr. President, we have one more application that came in last night of Alva C. Stein, graduate of the Ohio State University, College of Veterinary Medicine, 1911, properly vouched for and approved by the Board.

(Upon motion of Dr. Sisson, duly seconded, the application was accepted.)

REPORT OF COMMITTEE ON EMBLEM

PRESIDENT WHITE: There are a few committees yet to report. I will call for the report of the Emblem Committee.

DR. MCKENNA: Dr. Bennett has asked me to report.

(Dr. McKenna read the report of the Emblem Committee, as follows:)

Your committee has gone over the various drawings and suggestions which have been submitted to it, and recommends for adoption the emblem which has been adopted by the California State Veterinary Medical Association. The design for this emblem was drawn by Dr. H. B. Wintringham of Fresno, Calif., and is the caduceus with a superimposed V as used for collar ornament in the Veterinary Corps of the Army. This is placed in a maroon disc surrounded by a light band. The drawing as we are showing you here today is the exact size. This plate will have a metal border, inside of this a circle of white, hard enamel, and the center of the plate will be hard enameled in red with medical emblem and letter V showing in metal. The plates will have a 5-inch lug soldered on the back, which is long enough to extend clear through the radiator, and we will also furnish an iron washer and a wing nut for attaching. The metal parts of this plate will be finished in either brass or nickel plate, whichever is preferred.

One of the principal values these emblems will have will be for use on a member's automobile. Restrictive automobile legislation is constantly being enacted, and it is believed that our profession will be given the same recognition in regard to such legislation as time limit for parking automobiles in congested districts as is given members of the American Medical Association when their emblem is on a car.

The California State Association has taken the matter up with Bastian Brothers of Rochester, N. Y., the makers of the American Medical Association emblem, and has received the following quotation: Lots of 250 emblems, \$2.30 each; 350 emblems, \$1.90 each; 500 emblems, \$1.60 each. No doubt in larger quantities a better price could be obtained.

S. E. BENNETT, *Chairman*;
JOHN F. MCKENNA,
Committee on Emblem.

(A motion was made by Dr. Mayer, seconded by Dr. Fox, that the report be accepted.)

SECRETARY MAYO: I would like some information as to how this emblem is to be supplied. Is the Secretary to order them and supply them to the members?



Emblem Adopted by American Veterinary Medical Association

DR. McKENNA: My idea in regard to this is that if the report of the committee is adopted a motion should be made on the floor in reference to how they shall be distributed.

(The motion to adopt the report was carried.)

DR. McKENNA: In reference to the distribution of these emblems from the manufacturers, the Secretary of the State Association of California has so far had about fifty orders from the veterinarians in California. He has sent out a card, and his instructions from the State Association are that no one can secure this emblem unless he is a member of the Association. I believe that is the procedure in the A. M. A.; they are handled through the resident or the local secretaries, and unless a man is a member of the National Association he is unable to secure the emblem. I believe that rule would be a good one in this Association. It would perhaps stimulate membership in both sectional and State associations.

DR. HOSKINS: I believe it would be a good idea if the report of this committee would be published in an early issue of the JOURNAL. The Committee on Emblem might draw up some sort of an additional report outlining a probable way in which these emblems could be supplied, and through the Resident State Secretaries some idea could be obtained of exactly how many might be wanted. I believe that could be done much more rapidly through the JOURNAL than any other means of which I know.

SECRETARY MAYO: I would move that this be referred to the Executive Board with recommendations from the Emblem Committee. The Executive Board will meet in Chicago the latter part of November, and they have under consideration at that time various plans for increasing the membership of the Association, and I think that the Board could very properly devise a plan for distribution, with the suggestions from the committee.

(The motion was seconded by Dr. Fox and carried.)

REPORT OF BUDGET COMMITTEE

PRESIDENT WHITE: I will now call for the report of the Budget Committee.

(Secretary Mayo read the report of the Budget Committee, as follows:)

President's Fund	\$500.00
Intelligence and Education.....	1,000.00
Legislation	1,500.00
Salmon Memorial Fund, limited to postage and incidentals ...	50.00
Abortion Committee	500.00
Treasurer	300.00
Pharmacy	250.00
Anatomical Nomenclature.....	50.00

10 shares Horse Association of America.....	50.00
Necessary running expenses of JOURNAL office at Washington and expenses of Secretary's office.	

D. S. WHITE,
M. JACOB,
N. S. MAYO,
Budget Committee.

DR. HOSKINS: I move that the report be received and approved.

(The motion was seconded and carried.)

REPORT OF COMMITTEE ON ANATOMICAL NOMENCLATURE

PRESIDENT WHITE: I will now call for the report of the Committee on Anatomical Nomenclature.

DR. SISSON: In the absence of Dr. Murphey, the chairman, I will simply make a brief verbal statement to the effect that so far as I know no meeting of the committee has been held and consequently there is no formal report to be offered. I think it would probably be well to continue the committee, or at least a committee, in view of the fact that there is a proposition to have an International Committee on Nomenclature, and of course this body should have some representation on the National Committee or the International Committee.

PRESIDENT WHITE: You have heard the statement of a member of the Committee on Anatomical Nomenclature. It will require no motion.

REPORT OF COMMITTEE ON RESOLUTIONS

PRESIDENT WHITE: Is the Resolutions Committee ready to report?

(Dr. Jungerman read the report of the Committee on Resolutions, as follows:)

Resolution¹

Whereas, There has recently been a renewal of activities in the United States against animal experimentation, under the misleading name of a campaign against vivisection,

And whereas, Many false statements have been made to the effect that medical men do not regard animal experimentation as of value and do not approve of it, and that such experimentations are cruel and unnecessary;

Therefore be it Resolved, That the American Veterinary Medical Association hereby places itself on record as favoring animal experimentation, and as expressing its belief that animal experimentation is of the highest value, that it has furnished us with a large part of our present knowledge, and that it is the only method by which we can hope to solve many of our present problems, to save our animals from suffering and humanity from economic losses among its livestock.

And be it further Resolved, That we condemn and disapprove the campaign for the prevention of animal experimentation and all measures to place the supervision of such investigation under persons without sound medical, veterinary or biological education and training.

¹This resolution is given in the amended form as adopted.

And be it further Resolved, That we condemn as false the statements to the effect that animal experimentation is cruel or provocative of cruelty, it being a matter of common knowledge among veterinarians that animals used for experimentation purposes are handled with care and kindness, are not treated cruelly, and are given anesthetics whenever necessary to prevent suffering.

Resolution

Whereas, The American Veterinary Medical Association, while in convention at the city of Denver, has received the assistance and hospitality of the local committee and veterinarians of Colorado, the civic authorities and other organizations of Denver, the Albany Hotel, the Denver Cab Company, and the Parl Floral Company:

Be it Resolved, That the Association hereby records its appreciation of the many courtesies extended and the assistance received from each and all of them, and that the thanks of the Association be extended to them.

(A motion was made and seconded that the report be adopted.)

DR. JONES: The first resolution states that experimentation should only be by medical men and veterinarians. Of course under the supervision of medical men and veterinarians. Biologists use a great many more animals than either of us, and, of course, physiologists need not be medical men or veterinarians. I think that should be amended.

DR. JUNGEMAN: I think that reads that supervision should be maintained by men having medical training.

DR. MAURICE C. HALL: I think the suggestion is a good one. In drawing up this resolution I was writing rather hastily. It would be well to make that "of sound medical or veterinary scientific training," the idea being to head off the sort of supervision which is in vogue in England. The persons carrying on antivivisection campaigns have been sufficiently successful in England to hamper the work of animal experimentation very materially. Most people opposed to animal experimentation are doing it on sentimental grounds, and they have a supervision in England which is very restrictive, very injurious to English scientific research.

In this country we have had similar campaigns going on, and they will be going on in the future. Unless we take steps to head those campaigns off, American investigations of scientific medication in the biologic field will be hampered in the same way. There has been recently a fight in California on this subject. It has been brought up in the United States Congress a number of times, and very recently it has come up again. The veterinary profession, I believe, would be unanimous on this subject. I don't think it would be necessary to ask the A. V. M. A. to support this resolution. I have no doubt of their support, but I don't know that all of the members appreciate how very serious the situation is and how necessary it is that we combat in every possible way this propaganda to stop these experimentations. The men who are making the campaign are

putting it first on the basis of preventing experiments on dogs, but that is only a hindrance. When they have achieved that they will have stopped the experimentation entirely if they can.

In order to expedite the consideration of this resolution, I move that the Committee on Resolutions insert the word "biological" in addition to the words "medical and veterinary" in reference to supervision.

(The motion was seconded by Dr. Jones.)

PRESIDENT WHITE: This comes as an amendment to the report of the Committee on Resolutions by adding certain words in order to include the scope of those who indulge in this practice—namely, it would include biologists and other competent scientists.

(The amendment was carried.)

PRESIDENT WHITE: Now the question is on the original motion as amended.

(The report of the committee as amended was adopted.)

REPORT OF SALMON MEMORIAL COMMITTEE

PRESIDENT WHITE: We will now have the report of the Salmon Memorial Committee.

DR. MOHLER: In the absence of Dr. Brenton, I have been requested to present the report.

(Dr. Mohler read the report of the Salmon Memorial Committee, as follows:)

The report of the secretary-treasurer of the committee, the late Dr. W. Horace Hoskins, rendered at the Columbus meeting last year, showed that \$3,956.40 and one \$500 United States bond had been collected for the fund.

Since the 1920 report was made the sum of \$38 additional has been collected.

The funds that have been collected thus far have been placed on deposit in the Rittenhouse Trust Company of Philadelphia in the name of the Salmon Memorial Fund. This deposit bears interest, but your committee is unable to report at this time the exact amount of interest that has been credited to the account during the past year.

The will of the late Dr. W. Horace Hoskins, who was largely instrumental in the creation of the memorial to Dr. Salmon, and who has been so active in the collection of subscriptions to the fund, contained the following bequest:

"That the sum of \$100 be given to the Salmon Memorial Fund as a tribute to one of the most complete lives of unselfishness and true public service ever lived by any member of my chosen profession."

Your committee recommends that the Salmon Memorial Committee of this Association be continued, that an effort be made during the coming year to collect the balances of unpaid pledges, about \$5,500, and that the fund, or such part of it as may be deemed wise, be invested in Government bonds, the interest from these bonds to be made available as early as possible for the use of some worthy young man needing financial assistance in securing a veterinary education.

Receipts, Salmon Memorial Fund, 1920-21

Dr. J. Lebish.....	\$1.00
Dr. O. Howells.....	1.00
Dr. V. Carabba.....	1.00
Dr. D. F. Fox.....	10.00
California State Veterinary Medical Association.....	25.00
Total.....	\$38.00

S. BRENTON,

Chairman, Salmon Memorial Committee.

DR. EICHHORN: I move that the Association express its profound gratitude for the bequest of Dr. Hoskins.

(The motion was seconded and carried.)

DR. JAKEMAN: I move that the report of the committee be received.

(The motion was seconded and carried.)

PRESENTATION OF PAPERS

PRESIDENT WHITE: That seems to conclude the reports of committees. We have two papers, one entitled "Inspection of the Fish Food Supply of the United States Army," by Major George Lytle. Major Lytle is not here. The second paper is "Maryland Plan for the Eradication of Hog Cholera," by Dr. R. C. Reed, of College Park, Md.

(Dr. Reed read his paper, which will appear in a later issue of THE JOURNAL.)

PRESIDENT WHITE: The next paper will be "Types of Bacillus Bovisepticus Encountered in a Dairy Herd," by Dr. Fred R. Jones, of Princeton, N. J.

(Dr. Jones read his paper, presenting it with illustrations on the board. The paper was published in THE JOURNAL for December, 1921, page 271.)

PRESENTATION OF NEW OFFICERS

PRESIDENT WHITE: This concludes all of the papers. If there is no unfinished or new business, the next item will be the installation of officers. I will appoint Dr. Sisson and Dr. Goss to present the President-elect, Dr. Kinsley.

(Drs. Sisson and Goss conducted Dr. Kinsley to the chair.)

PRESIDENT WHITE: It is a pretty little custom which has come down to us through the years to have the outgoing President present to the incoming President a gavel, and a gavel with a history. This badge of authority was presented to this Association by the late W. T. Monsurat, of Honolulu, Hawaiian Islands, at the Minneapolis Convention in 1902. I believe this late member was known as Honolulu Bill. There is an inscription on this gavel, the meaning of which I do not know, but I assume that it greets the incoming President with a wish of prosperity, the best of luck and the heartiest cooperation of the member-

ship of this Association. I trust that he will find his service as pleasant and as inspiring as mine has been. I hope also that he will receive your courteous treatment, hearty cooperation, respect and helpfulness that I have received. Dr. Kinsley, permit me to present this gavel. (Applause.)

DR. KINSLEY: Mr. Chairman, Gentlemen of the Association, I first wish to thank you cordially for the honor you have conferred upon me. In accepting the executive position of this Association I am not unmindful of the obligation that I will have to meet. I am going to ask each and every one of you, as members, committeemen and officers of this Association, to assist, help and cooperate in every way in making the coming season one of the best Association years we have had. (Applause.)

PRESIDENT WHITE: Permit me to install and introduce two of the five Vice-Presidents, the First and Second. I don't know where the other three are. A member remarked to me at this meeting that we had too many Vice-Presidents. I told him there was no evidence of that fact, as none of them was present. If you desire, and if these men are anxious to deliver themselves of a short oration on this occasion, we shall be glad to hear from them.

DR. LAMB: Mr. Chairman and Gentlemen, I am not going to try to inflict any address upon you, but I want to thank you for the honor conferred. I appreciate the fact that to be President of this Association is the highest honor that can be conferred on any veterinarian. Naturally I say that the office of Vice-President is the second highest honor, so I consider I have been elected to receive the second highest gift of the Association, and I appreciate it as such. At the same time I realize that this honor was not conferred upon me because my name happened to be Lamb. It was, I think, conferred upon the veterinarians of this district with me as their representative. I don't presume that the office of Vice-President will require any arduous labors on my part with such a man as President as Dr. Kinsley with his well-known ability and activity in all lines as we know him, but if occasion should require that any duty devolve upon me, I assure you I would be ready and willing to assume it to the best of my ability. (Applause.)

DR. MCKENNA: Mr. Chairman and Gentlemen, I appreciate the honor of being elected Vice-President of this Association, and I assure you that the veterinarians of the Far West appreciate recognition in this Association. I assure Dr. Kinsley and the other officers of my hearty cooperation, and I will be glad to assist in any way I can in our part of the country. (Applause.)

(A motion was made, seconded and carried, to adjourn the convention *sine die*.)

(*Proceedings of section meetings will appear in February JOURNAL.*)

EXECUTIVE BOARD MEETING

ST. LOUIS GETS NEXT CONVENTION

At the meeting of the Executive Board of the A. V. M. A.; held in Chicago on November 27, the Board voted that the 1922 meeting of the A. V. M. A. would be held in St. Louis, Missouri, and that the dates would be August 28 to September 1, inclusive.

In connection with the program for the next meeting the Board thought it advisable to have a two days' clinic to be in charge of the best operators that could be procured, the clinic to be devoted to diseases of cattle, hogs, dogs and poultry, together with general surgical subjects.

The Executive Board authorized President Kinsley to appoint a committee of three to cooperate with the National Formula Committee with reference to new and non-official veterinary remedies. President Kinsley appointed Drs. Brunley of Columbus, Klein of Philadelphia, and Milks of Ithaca, New York, the first named being chairman.

The question of the legality of the election of officers for the Sections on "Sanitary Science and Police" and "Education and Research" at the Denver meeting, was brought before the Board. The Board ruled that the officers of the section on "Education and Research" for the past year, should continue for the present year.

The Secretary was authorized to purchase 500 automobile emblems, and that these emblems were to be sold to members for \$1.25 each.

Treasurer Jacob made a report on the funds of the Association. The Board authorized Treasurer Jacob to purchase \$10,000 worth of American or Canadian Government bonds.

N. S. MAYO.

IT WILL PAY

The Committee on Increasing Membership of the A. V. M. A., consisting of President Kinsley, Dr. Hilton, chairman of the Executive Board, Dr. Mohler, editor of the JOURNAL, and Secretary Mayo, held a meeting recently in Chicago.

It is planned to put on an active campaign to increase the membership, and it was decided that every member of the Asso-

ciation who is not an official will receive a rebate of \$1.00 on his annual dues for every application for membership that he sends in. Five new applications will pay the member's dues for a year. If he gets more than five the amount will be applied on the next year's dues.

Application blanks will be sent to any member who desires them, if he will drop a postal card to Secretary Mayo.

AN HONOR FOR THE A. V. M. A.

The National Veterinary Society of Cuba, through its President, Dr. B. Crespo, has cabled an invitation to the A. V. M. A. to send a delegate to the Fifth Annual Medical Convention of Cuba. The delegate is to be the honored guest of the Cuban National Veterinary Association, who will pay all expenses of the trip to Cuba as well as all expenses during the week of the convention in Havana.

In response to this hospitable and generous invitation, President Kinsley has named Dr. R. P. Marsteller, of College Station, Texas, to represent the A. V. M. A. at this convention.

The Medical Convention of Cuba is composed of physicians, veterinarians, dentists and pharmacists. A splendid scientific and practical program has been arranged and we know that all members of the American Veterinary Medical Association will be much interested in the report that Dr. Marsteller will make of this splendid convention.

We feel sure that the A. V. M. A. will express its appreciation for the honor conferred by the National Veterinary Association of Cuba.

N. S. MAYO.

NOMINEES FOR EXECUTIVE BOARD

The following are the nominees selected by postal card vote from among whom a member of the Executive Board will be elected to represent District No. 6:

- J. H. Bux, Arkansas.
- B. W. Conrad, Kansas.
- D. F. Fox, California.
- H. Jensen, Missouri.
- N. F. Williams, Texas.

A. V. M. A. COMMITTEE APPOINTMENTS

President Kinsley has appointed Dr. James Robertson, of Chicago, a member of the A. V. M. A. Committee on History, to succeed Dr. R. C. Moore, who resigned.

President Kinsley has appointed Dr. J. P. Turner, 918 O street northwest, Washington, D. C., and Dr. R. R. Clark, Newport News, Va., a committee of the A. V. M. A. to cooperate with similar committees representing medicine, dentistry and pharmacy, in the preparation of a model Federal Narcotic Law or a revision of the present law. The committee will gladly receive any suggestion from the profession regarding this matter.

UNITED STATES LIVE STOCK SANITARY ASSOCIATION

The twenty-fifth annual meeting of the United States Live Stock Sanitary Association was held at the La Salle Hotel, Chicago, Illinois, November 28, 29 and 30. This annual event is growing in interest and importance each year. It is estimated that notwithstanding the fact that it was International Livestock Exposition week and the meetings of the National Association of Commissioners, Secretaries and Departments of Agriculture, and the National Association of Marketing Bureaus were scheduled to take place at the same time, and that the Illinois Veterinary Medical Association also was to meet in Chicago on December 1 and 2, there were in attendance over 400 veterinarians, U. S. Bureau of Animal Industry officials, State regulatory authorities, livestock breeders and others. An excellent program was prepared for the occasion and it was notable that with two exceptions all whose names appeared on the program responded when they were called.

President W. F. Crewe called the meeting to order and requested Mr. H. R. Smith, Livestock Commissioner of the Chicago Livestock Exchange, to deliver the address of welcome in the absence of Dr. John Dill Robertson, Commissioner of Health, who was expected to welcome the members of the Association to Chicago on that occasion. Commissioner Smith ably performed this unexpected assignment, and Hon. J. H. Mercier, Livestock Commissioner of Kansas, responded in the pleasing manner for which he is noted. In a very earnest and timely address, President Crewe referred to the establishment of the as-

sociation, its development, its progress, and some of the problems that now confront it and the livestock industry. During the remainder of the first session, the report of the Committee on Legislation was presented by H. R. Smith, chairman, and a period was devoted to a memorial for the only departed member, Dean W. Horace Hoskins; Dr. J. I. Gibson, of Bloomington, Ill., led in the memorial exercises. Dr. J. F. DeVine and Major Charles Jewell delivered appropriate eulogies on the life and work of Dr. Hoskins, who will be remembered as a man among men, as a successful practitioner and educator, and for his zealous, untiring efforts to advance the veterinary profession to a higher plane of usefulness, respect and recognition. The afternoon of the first day was devoted to a joint session of the U. S. Live Stock Sanitary Association, the National Association of Commissioners, Secretaries and Departments of Agriculture, and the National Association of Marketing Bureaus, with Hon. Alva Agee, Secretary of the New Jersey Department of Agriculture, in the chair. At this session the association was honored by an address from Hon. Henry C. Wallace, Secretary of Agriculture. Immediately following the address of the Secretary, Hon. Fred Rasmussen, Secretary of the Pennsylvania Department of Agriculture, Mr. A. J. Glover, editor of *Hoard's Dairyman*, and D. V. Moore of Iowa, addressed the assemblage on the "Value and Desirability of a Joint Session Yearly of the U. S. Live Stock Sanitary Association with Other Bodies Represented."

Dr. O. H. Eliason, State Veterinarian of Wisconsin, read a paper on the subject of "Live Stock Regulations at Fairs and Expositions, with Special Reference to Accredited Herds," and Dr. J. A. Kiernan, Chief of the Tuberculosis Eradication Division, B. A. I., expressed his views on "What Commissioners of Agriculture Can Do to Assist the Tuberculosis Eradication Movement." The discussion of these papers was ably led by Hon. D. M. Davidson, Director of Agriculture, Springfield, Illinois; Hon. H. H. Halladay, Commissioner of Agriculture, Lansing, Michigan; Hon. C. P. Norgord, Commissioner of Agriculture, Madison, Wisconsin; and Hon. E. C. Brigham, Commissioner of Agriculture, St. Albans, Vermont. It was a mutual pleasure and benefit for the members of these closely allied associations to meet in joint session. This joint meeting afforded an opportunity to become personally acquainted and more familiar with the relation of these organizations to each other and

the work each is doing on problems in which all are interested. The trend of the discussion plainly indicated a consensus of opinion that as these organizations hold their annual meetings about the same time, arrangements should be made for a joint session each year.

The first session on the second day was devoted to abortion disease among animals. Dr. W. L. Williams, Emeritus Professor of Veterinary Medicine, Cornell University, Ithaca, New York, read a paper on "Suggestions for the Improvement of the Reproductive Efficiency of Cattle." Dr. E. C. Schroeder, Superintendent of the B. A. I. Experiment Station, Washington, D. C., read a paper on "Bureau of Animal Industry Investigations on Bovine Infectious Abortion," and Dr. T. H. Ferguson, a veterinary practitioner of Lake Geneva, Wisconsin, who has given the subject much study, read a paper on "Herd Control of Infectious Abortion in Cattle." The papers read by Dr. Williams and Dr. Schroeder were among the most prominent features of the meeting, both on account of the recognized standing of the authors in the field of research and the scientific and economic importance of their subjects. The discussion that followed the reading of the papers commanded more than ordinary attention, owing to the participation by men prominent in their special lines, among whom were Dr. C. P. Fitch, Chief of the Division of Veterinary Medicine, University of Minnesota; Dr. Adolph Eichhorn, Director of the Veterinary Department of the Lederle Antitoxin Laboratories, Pearl River, New York; Dr. Ward Giltner, Professor of Bacteriology and Hygiene, Michigan Agricultural College; Dr. Edward A. Cahill, Director of the Pitman-Moore Laboratories, Indianapolis, Indiana; Dr. George Dick, Professor of Animal Industry at the Veterinary Department, University of Pennsylvania; Dr. J. W. Connaway, Professor of Veterinary and Comparative Medicine, University of Missouri; Dr. C. E. Cotton, State Veterinarian of Minnesota; Dr. J. G. Ferneyhough, State Veterinarian of Virginia; and Dr. C. W. Eddy, Veterinarian for Tellings-Belle Vernon Company, Cleveland, Ohio.

At the afternoon session on the same day, Dr. Eichhorn spoke on "Control of Anthrax by Simultaneous Treatment"; Dr. W. J. Butler, State Veterinarian of Montana, discussed "Methods of Eradicating Scabies in Sheep"; and Dr. James S. Healy, the B. A. I. representative in cooperative tuberculosis eradication

work in Wisconsin, addressed the association on the "Methods by Which Tuberculosis is Spread" among animals.

The forenoon of the last day of the meeting, November 30, was devoted to the consideration of swine diseases. Dr. C. H. Stange, Dean of the Iowa State Veterinary College, presented the Report of the Committee on Infectious Swine Diseases; Dr. U. G. Houck, Chief of the Division of Hog Cholera Control, B. A. I., Washington, D. C., presented the Report of the Committee on Interstate and Intrastate Shipment of Swine, and in the absence of Dr. T. P. White, Dr. W. T. Spencer, Livestock Commissioner, Omaha Livestock Exchange, presented the Report of the Committee on Hog Cholera Control. Dr. M. Dorset, Chief of the Biochemic Division of the Bureau of Animal Industry, gave a very interesting and instructive talk on swine diseases in which he informed the association of the results of his experiments with snipestifer bacterins. Dr. Edward A. Cahill read an interesting paper on "Factors Influencing the Control of Swine Diseases," which was discussed by Dr. George E. Corwin, Commissioner on Domestic Animals, Hartford, Connecticut, and Dr. B. F. Edgington, State Veterinarian of Ohio. Dr. A. T. Kinsley, Deputy State Veterinarian of Missouri, and Dr. W. W. Dimock of the Department of Veterinary Science, Kentucky Agricultural Experiment Station, led in the discussion of Dr. Dorset's experiments. The reports of the Committee on Swine Diseases resulted in the most spirited discussion that occurred during the meeting. Dr. Kinsley's criticisms of the Report of the Committee on Infectious Swine Diseases were met by prompt, vigorous retorts from the members of the committee. Both the criticisms and the replies were appreciated, especially by the members who were interested in the differential diagnosis and treatment of swine diseases.

The last session of the meeting was devoted to the reports of committees and the election of officers. The Committee on Resolutions presented three resolutions, in effect as follows:

That, in the production of milk, whether for consumption in cities or in rural homes, the tuberculin testing of cattle should be by all means insisted upon as an indispensable measure of preventing the dissemination of tuberculosis.

That, in view of the necessity of conserving State and Federal indemnity funds, we heartily commend the action of the Institute of American Meat Packers in recommending that all pack-

ing companies and local butchers pay as much for reacting cattle that pass food inspection as for healthy cattle of the same quality sold on the open market, and urge also that conservative appraisement be made on all reactors.

That the association unqualifiedly endorse and recommend that the strictest attention be given to the conservation of all funds appropriated by counties, States and Federal Government, and any other agencies contributing to the tuberculosis eradication campaign.

A motion was passed giving the Executive Committee authority to change the dates of the meeting if it deems advisable, to commence on Wednesday of the week of the International Livestock Exposition instead of on Monday as in the past.

Another motion was passed that an evening be designated during next year's meeting for a joint session with the National Association of Commissioners, Secretaries and Departments of Agriculture, and National Association of Marketing Bureaus.

The convention passed an amendment to the accredited herd plan which permits accredited veterinarians to make the preliminary tests of herds in the process of accreditation, no indemnity to be paid by the Government for cattle condemned in such tests. After the herd has shown one clean test the final test must be official and must be a combination test by the subcutaneous, intradermic and ophthalmic methods. This will permit of greater speed in the work without lowering either efficiency or thoroughness.

In connection with the report of Dr. L. E. Northrup, chairman of the Committee on Finance, a motion was passed in effect that the matter of publishing the Report of the Twenty-fifth Annual Meeting of the Association be left to the Executive Committee of the organization and that the committee be authorized to borrow money, if necessary, to have the report published, and in case of a deficit, to report it to the association at the next meeting.

The election of officers for the coming year resulted as follows: President, Dr. T. E. Munce, State Veterinarian of Pennsylvania, Harrisburg, Pennsylvania; vice-presidents, Dr. W. C. Simmons, State Veterinarian of Kentucky, Frankfort, Kentucky; Dr. B. F. Davis, State Veterinarian of Wyoming, Cheyenne, Wyoming; Dr. Edward Records, Director of the Nevada State Veterinary Control Service, Reno, Nevada; Hon. J. H. Mercer, Kansas

Livestock Commissioner, Topeka, Kansas; Dr. O. H. Eliason, State Veterinarian of Wisconsin, Madison, Wisconsin; secretary, Dr. O. E. Dyson, 5451 Woodlawn Avenue, Chicago, Illinois.

At present the membership of the U. S. Live Stock Sanitary Association numbers 825, including 31 admitted at the last meeting. It seems that the small membership is probably due to the fact that many veterinarians and others are laboring under the mistaken impression that only those engaged in national or State regulatory work are eligible to membership. Section 5 of the Constitution of the association reads as follows:

“Any person engaged in livestock sanitary work for Federal, State, Territorial, county or municipal governments shall be eligible to membership in this association, and any other person interested in livestock sanitation may be elected to active membership upon the recommendation of the executive committee and a two-thirds vote of the members present.”

The membership is much lower than it should be considering the purposes of the association. Each member should regard it a personal duty to put forth earnest efforts during the coming year to increase the enrollment in this useful and important organization.

A SUCCESSFUL TUBERCULOSIS ERADICATION CONFERENCE

The Tuberculosis Eradication Conference of State, County, Municipal and Federal Employees engaged in tuberculosis eradication work and others interested in the livestock industry, which was held in Chicago, Illinois, on November 25 and 26, 1921, was unusually successful. This is evidenced by the very large attendance of 560 persons, who maintained their interest throughout the various sessions. A well arranged program was offered, commencing on the morning of the first day with an address of welcome by the Honorable B. M. Davison, Director, Department of Agriculture, Springfield, Illinois. Following this, Dr. John R. Mehler, who presided, explained the objects of the conference and described some of the activities that should receive most careful consideration. Following this, Dr. E. C. Schroeder, Superintendent of the Experiment Station of the Federal Bureau, gave an interesting résumé of the experimental work conducted at the station relative to the problem of

controlling bovine tuberculosis. Dr. W. F. Crewe, President of the U. S. Live Stock Sanitary Association, followed with a pointed argument relative to cooperation between all of the parties interested in the total eradication of the disease.

At the afternoon session, Dr. L. Enos Day, of Chicago, Ill., gave carefully prepared statistics relative to obscure lesions in bovine tuberculosis and illustrated them by a series of beautiful mounted specimens. One of the most interesting talks of the session was that presented by Mr. A. J. Glover, Editor of *Hoard's Dairyman*, who spoke on "The Editor and the Breeder." Mr. Glover's talk was well received, as he has both personally and editorially forwarded the movement in every way possible.

Dr. G. E. Corwin, Deputy Commissioner on Domestic Animals, of Connecticut, speaking on the specifications under which the intradermic test should be made, gave statistics relative to delayed reactions following the injection of tuberculin by this method. Considerable discussion followed this paper, which resulted in a motion by Dr. W. J. Butler, of Montana, that the question of the technique and comparative reliability of this and other methods of tuberculin testing be referred to the Bureau of Animal Industry with the view of obtaining extensive statistics for presentation at the next year's conference.

Mr. James Brown, a breeder of Shorthorn cattle, gave a practical talk from the viewpoint of the stock raiser, on the eradication of tuberculosis from a purebred herd. Another talk of much interest to the conference was that of combination tuberculin test methods by Dr. L. B. Ernest, of the Federal Bureau. The last speaker of the afternoon session was Dr. Isaac Abt, Professor of Pediatrics, Department of Medicine, Northwestern University, who spoke on clinical studies relative to tuberculosis of children. This address was of more than usual instructiveness because of the new facts presented by one recognized as an authority, and also because of the firm stand taken on the danger of bovine tuberculosis to children.

On the morning of the second day, Dr. J. G. Ferneyhough, State Veterinarian of Virginia, gave a very interesting talk on the results obtained by returning accredited herds to the accredited veterinarian. Mr. Thomas Wilson, President of the Institute of American Meat Packers, through his representative, Dr. Fred Eagle, contributed a well prepared paper concerning the economic importance of eradicating tuberculosis. Follow-

ing this, Mr. Everett C. Brown, President of the National Live Stock Exchange, through his representative, Professor H. R. Smith, gave interesting data to show the interest his organization had in the completion of this nation-wide problem. Hon. E. S. Brigham, Commissioner of the Vermont Department of Agriculture, spoke on the subject of 27 years' experience with tuberculin testing, and showed the possibilities of an intensive campaign, once it is properly organized and started. The breeders of purebred cattle were again heard from through Mr. L. A. Campbell, President of the American Aberdeen-Angus Breeders' Association, who told of the advantages of an accredited herd. Following Mr. Campbell, Dr. C. E. Cotton, Secretary, Live Stock Sanitary Board, St. Paul, Minn., gave information relative to the progress of the control work in his State.

At the afternoon session Dr. D. F. Luckey, State Veterinarian of Missouri, told of the progress of the work in that State, where at the present time they have 20 counties under the area plan of eradication. This was followed by a talk from Dr. T. S. Rich, inspector in charge of tuberculosis work in Michigan, who gave the details of the recent intensive area campaign conducted in Hillsdale County, Michigan. Dr. M. Jacob, of the University of Tennessee, submitted a report of his committee relative to the plans for establishing tuberculosis-free areas. Of especial interest to the official livestock sanitarians present was the address of Dr. J. G. Townsend, veterinary practitioner of Racine, Wis., who gave a clear and definite opinion of the place the general practitioner should occupy under the accredited-herd plan. The most instructive and probably the most important address of the entire conference was that presented by Dr. W. A. Evans, of the Health Department of the Chicago *Tribune*, who spoke on Why Health Departments Are Interested in the Eradication of Bovine Tuberculosis. Dr. Evans' conclusions were of such importance and so well presented as to meet the needs of those in attendance at the conference better than any other similar material which has been afforded those engaged in the movement. The following quotation from his talk is of such vital importance to both the medical and the veterinary professions as to lead to its being given great prominence. He stated: "The relationship between the human and bovine tubercle bacilli leads health departments to the opinion that while programs for the repression of human tuberculosis, which

take no note of tuberculosis in other animals, may be successful, the time to strike for repression of human tuberculosis can not come until the program for control of bovine tuberculosis is well advanced." This is food for thought for all interested in the control of the Great White Plague. A rising vote of thanks was extended to Dr. Evans for his interest in contributing so largely to a successful conference.

Mr. H. E. McCartney, County Agent, Harlan, Iowa, spoke on the County's place in the tuberculosis eradication campaign, and gave interesting facts concerning how the movement was promoted in his county. The conference concluded with a synopsis of the report of the Committee on Tuberculosis of the United States Live Stock Sanitary Association by the Chairman, Dr. T. E. Munce, State Veterinarian of Pennsylvania.

The Advisory Committee of the Tuberculosis Eradication Convention, through its Chairman, Commissioner J. M. Whittlesey, presented the following resolutions, which were adopted:

Whereas, It has been established by incontrovertible investigations made by recognized authorities, that bovine tuberculosis is transmitted to the human family through the medium of milk and its products to such an extent that it must be recognized and prevented; and

Whereas, The eradication of bovine tuberculosis is for the twofold purpose of preventing the dissemination of the disease to the human family and to perpetuate the livestock industry upon a sound and healthful basis; be it

RESOLVED, That in the production of milk, whether for consumption in the cities or in rural homes, the tuberculin testing of cattle should be by all means insisted upon as an indispensable measure of preventing the dissemination of tuberculosis.

INTRADERMIC CODE

It is recommended that the first paragraph of the code for use in connection with recording the intradermic tuberculin test be amended to read as follows:

"The first observation should be made on or about the 72d hour after the injection. If it appears to the inspector making the test that more than a slight infection of tuberculosis is present in the herd, a second observation should be made on or about the 120th hour after the injection and if it appears necessary an observation should again be made on or about the 144th hour after the injection of the tuberculin.

"SECTION 1. That the requirements for tuberculosis-free area work be similar to the tuberculosis-free accredited-herd work and to be applied to all cattle located in said area.

"SECTION 2. That before any area shall be recognized as tuberculosis-free, after having complied with Section 1 of this resolution, there must be satisfactory assurance of official livestock sanitary police restrictions to prevent reinfection of said area."

SALVAGE AND APPRAISEMENTS

In view of the necessity of conserving State and Federal indemnity funds, we heartily commend the action of the Institute of American

Meat Packers in recommending that all packing companies and local butchers pay as much for reacting cattle that pass food inspection as healthy cattle of the same quality sold on the open market, and urge also that conservative appraisalment be made on all reactors.

INDEMNITY

The payment to the owner of indemnity for tuberculous cattle is a justifiable procedure which has the endorsement of this conference. However, we recognize that no practice should be continued which places any premium on diseased animals.

We unqualifiedly endorse and recommend that the strictest attention be given to the conservation of all funds appropriated by counties, States, the Federal Government, and any other agencies contributing to the tuberculosis eradication campaign.

Suitable resolutions, thanking the Chief of the Bureau for his promotion of the conference, were adopted. It was also decided to have all the addresses and papers, together with the discussions pertaining to them, published and distributed at the price of \$1.00. On November 27, the members of the conference visited the Union Stock Yards, for the purpose of witnessing the results of experimental tuberculin testing of 30 head of cattle by the subcutaneous and intradermic methods.

This demonstration concluded what was unanimously considered as the most instructive and successful tuberculosis eradication conference that has thus far been held.

CONFERENCE OF RESEARCH WORKERS IN ANIMAL DISEASES

The third conference of State and National Research Workers in Animal Diseases was held at the Sherman Hotel, Chicago, Ill., on November 26, 1921, with the chairman, Dr. Marion Dorset, of Washington, D. C., presiding.

Representatives from 20 States and from the United States Bureau of Animal Industry research divisions were present. The following program was presented: The Bacterial Flora of the Genital Tract of Cattle, by Dr. V. A. Moore; The Pathology of Sterility in Cattle, by Dr. E. T. Hallman; Infectious Abortion in Cattle, by Dr. C. P. Fitch; Experimental Immunization Against Icterohemoglobinuria in the Field, by Dr. Edward Records; Investigation of White Diarrhea of Young Chicks, by Mr. L. P. Doyle; Studies of Hemorrhagic Septicemia Sera, by Drs. L. Van Es and Martin; Botulism in Swine, by Dr. Robert Graham; Report of Committee on Infectious Colitis of Swine, by Dr. W. W. Dimock, Chairman; Report of Committee on Hog

"Flu," by Dr. Charles Murray, Chairman; The Precipitation of Tuberculin and the Preparation of Tuberculin Dises, by Drs. M. Dorset and J. A. Emery.

The objects of the conferences are to promote research in animal diseases by bringing into closer relation the various official agencies engaged in such activities. The conference elected Dr. C. H. Stange, of the Iowa State College, Chairman, and Dr. R. A. Whiting, of Purdue University, LaFayette, Indiana, Secretary for the year 1922.

BRITISH COLUMBIA VETERINARY ASSOCIATION

I beg to submit the following as the annual report of the Association for the year ending August 17, 1921:

You will note that this is in the form of a letter this year, the usual book form being eliminated on account of expense.

Though the receipts for the association year were up to normal, expenses were greater on account of the larger attendance at the banquet and increased cost of printing.

I felt, however, that the members of the association who are unable to attend the annual meeting are still entitled to a report of the year's activities, and hope you will approve this economical method of sending them.

At the beginning of the year, in which I had the honor of being elected as your president, we held a most successful banquet in New Westminster, the Hon. Dr. S. F. Tolmie being in the chair. The toast list contained many prominent speakers, including Mr. G. Hutton, Chief of the Natural Resources Department of the C. P. R.; Hon. Mrs. Ralph Smith, M. P. P.; Mr. C. A. Welsh, president, New Westminster Exhibition; Mrs. Paul Smith, president of the local Council of Women, who made a speech that was most favorable to the veterinary profession. Members of Parliament, prominent stockowners and exhibitors were also present, together with the members of the association, making a total of over 60 people.

Favorable comment was heard on all sides afterward, and in the press regarding the successful manner in which the banquet was carried out, and I feel it will do the profession a great deal of good.

In regard to amendments to the B. C. Animal Contagious

Diseases Act, referring to the sale and use of tuberculin, which permits the use of tuberculin by laymen, the association sent a delegate to the Dairyman's Convention in Victoria, who brought the matter up. The Dairyman's Association honored this association by placing its delegate on the resolutions committee on the subject of tuberculosis.

We have been unable to get these amendments altered, the Deputy Minister of Agriculture, Dr. Warnock, being opposed, and he stated at the convention that the use of tuberculin by laymen in outlying districts should be permitted. A suggestion of a license in these rare cases he would not accept. The matter, however, is still before the association.

The question of the sale of tuberculous meat without inspection still occupies the time of the council.

I have pleasure in announcing that, partly owing to the efforts of this association, the Government has appointed a qualified veterinarian as Director of Veterinary Services for Canada.

On July 14 and 15 a very successful international convention was held in Seattle, Wash. Some 60 veterinarians from the States of Washington, Oregon, Idaho and the Province of British Columbia were present, and two days were fully taken up with professional business.

I feel proud of the large delegation that went from this association, and I took the opportunity on our behalf to invite the convention to meet with us next year in Vancouver, which was unanimously accepted.

An important resolution was introduced by us, which was carried, asking the veterinary colleges to give a post-graduate course to qualify veterinarians to act as veterinary health officers.

A contribution of \$25 was made to the Andrew Smith Memorial Fund, in lieu of a personal canvass of the members.

The question of the formation of a Canadian Veterinary Association has been before our profession a number of years. I think the time is fast approaching when such an association should be in operation, and I would recommend to the incoming council that a committee be appointed to interview the Hon. Dr. S. F. Tolmie on this subject on his coming visit to the Coast.

In conclusion, I would like to say to the members-at-large that the various activities of the association have for their object the betterment of the practitioner, by bringing the value

of veterinary science more before the general public and by pointing out to them the valuable services that the veterinary profession can render in any community.

T. H. JAGGER, *President*.

NATIONAL ASSOCIATION OF B. A. I. VETERINARIANS, METROPOLITAN DIVISION

A meeting of the Metropolitan Division, N. A. B. A. I. V., was held in the lecture room of the Veterinary College, New York University, 331 East 26th Street, New York City, October 21, 1921.

Twenty members were present, with President Dr. N. L. Townsend presiding.

Dr. A. McBride, Vice-President, who represented the division as delegate at the recent National Convention at Denver, presented a report on the proceedings at that convention. His report was complete, very interesting, and well received by the members. Dr. Townsend, former President, and now Vice-President of the National Association, also spoke interestingly of the convention. Among the subjects discussed at Denver, referred to by the speakers and of particular interest to the members, was that of reclassification. The reports were optimistic as to ultimate favorable action by Congress of a reclassification bill satisfactory to veterinarians and lay inspectors.

Dr. Townsend submitted a proposition at this meeting designed to revive interest of members in the Metropolitan Division. His plan in brief was that this organization should be made a real veterinary association whose object shall be to discuss not only Bureau work and welfare, but also veterinary or professional topics in general.

With this idea in view, the President announced that he had appointed a committee to be known as the "Program Committee," consisting of Doctors Albert Long, Robert M. Mullings, A. F. Martins and Leland D. Ives. The special aim and object of this committee would be to receive suggestions of members and to arrange and decide on programs of work to be taken up at the different meetings. The meetings of the Division, according to this plan, would be held regularly about once every two months, or oftener if desired by the members.

Dr. Long, chairman of this committee, reported that he had given some thought to the proposition as outlined and had requested suggestions of members. Among the suggestions offered for subjects to be considered at meetings were reading and discussion of papers on various subjects of special interest in connection with meat inspection and also other activities of the Bureau, such as tuberculosis eradication, tick eradication, hog cholera control, etc., as well as veterinary topics in general: presentation, demonstration and discussion on interesting or unusual pathological specimens found by inspectors in the course of their work at different establishments; discussions on the regulations, especially regulation 11, with the object of securing proper and uniform disposition of carcasses or parts at the various stations included in the Metropolitan Division.

It was emphasized by the chairman and other members of the Program Committee who addressed the meeting, that the success of this new plan depended on the active assistance and whole-hearted cooperation of all members. Expressions of opinion given by the members present showed enthusiastic approval and augured well for the future success of the Metropolitan Division. Dr. Robert M. Mullings announced that he would start the ball rolling by reading a paper on "Technique of Postmortem Inspection" at the next meeting.

EDWARD L. SANDER, *Secretary*.

ILLMO VETERINARY MEDICAL ASSOCIATION

The seventeenth semi-annual meeting of the Illmo Veterinary Medical Association was held October 28, 1921, in the auditorium of the Jno. T. Milliken Drug Co., St. Louis, Mo. Although the attendance was not so great as at some of the past meetings the enthusiasm exhibited was highly satisfactory. The visit through the pharmaceutical plant of the drug company, concluding in their cafeteria, was interesting and pleasing.

New officers elected were as follows: M. J. Huggins, National Stock Yards, Ill., President; C. B. Michaels, Evansville, Ill., Vice-President; L. J. Miller, Waterloo, Ill., Treasurer; L. B. Michael, Collinsville, Ill., Secretary. This association went on record with a strenuous resolution to secure the A. V. M. A. Convention for St. Louis, Mo., in 1922.

L. B. MICHAEL, *Secretary*.

SCHUYLKILL VALLEY VETERINARY MEDICAL ASSOCIATION

The Schuylkill Valley Veterinary Medical Association held a well-attended meeting at Leesport, Pa., on Wednesday, November 16, 1921. A clinic was conducted at Dr. O. B. Rahn's hospital, at which a number of operations on small animals were performed. The meeting was continued in the town hall, where papers were read by Dr. V. G. Kimball, of the University of Pennsylvania, on "Colics," and by Dr. U. S. G. Bieber, Kutztown, Pa., on "Distemper." The next meeting of the association will be held at Reading, Pa., on December 21, 1921.

R. L. BERGER, *Secretary*.

PHILADELPHIA VETERINARY CLUB

The regular monthly meeting of the Philadelphia Veterinary Club was held November 22, 1921, at the Veterinary School of the University of Pennsylvania.

Dr. F. S. Jones, Rockefeller Institute, Princeton, N. J., addressed the Laboratory Section on "An outbreak of pneumonia in dairy cows attributed to *B. bovissepticus* and types of *B. bovissepticus* encountered in a dairy herd."

There was also an interesting discussion on abortion and retained placenta.

The Club went on record as endorsing the intradermic test and recommended that the accredited veterinarian be given more recognition.

The meeting was well attended.

C. S. ROCKWELL, *Secretary*.

SOUTHEASTERN STATES VETERINARY MEDICAL ASSOCIATION

The next meeting of the Southeastern States Veterinary Association will be held February 6 and 7, 1922, at Nashville, Tenn.

An interesting program is being arranged, a copy of which will appear in the next issue of this JOURNAL. Some of the very best scientists and practitioners will give discussions on current problems.

All qualified veterinarians in the Southeastern States and adjoining States are urgently requested to attend this meeting.

With your support the convention should prove to be the best one that the association has ever had.

Any information concerning the program or meeting will be given through the Secretary or other officers of the association.

JNO. I. HANDLEY, *Secretary*.

CENTRAL MICHIGAN VETERINARY MEDICAL SOCIETY

A meeting of the Central Michigan Veterinary Medical Society will be held in Jackson, Mich., at the Jackson City Club on Friday, January 6, 1922.

W. N. ARMSTRONG, *Secretary*.

MISSISSIPPI STATE VETERINARY MEDICAL ASSOCIATION

Elaborate plans have been made for the entertainment of the members and friends of the Mississippi State Veterinary Medical Association which will hold its Sixteenth Annual Convention at Gulfport, Mississippi, January 23 and 24, 1922. The association has departed from its former two-day session and will devote the second day of the coming convention entirely to getting acquainted and enjoying the sights and pleasures of Mississippi's winter playground.

The wives and sweethearts of the members and friends will be in attendance and an appropriate banquet will be given in their honor.

While the number of veterinarians in this State is not large, they are good association workers and have generally succeeded in having in attendance some of the best talent available. The last annual convention, which was held at Canton, Miss., was honored by the presence of Adolph Eichhorn, M. Jacob, C. E. Salsbery, and J. A. Kiernan, all nationally known veterinarians, and it is expected that several of these men will be with us at Gulfport and also a number of others of equal note.

J. A. BARGER, *Secretary*.

COLORADO VETERINARY MEDICAL ASSOCIATION

The next meeting of the Colorado Veterinary Medical Association will be held at 1525 Curtis Street, Denver, Colorado, on Thursday, January 19, 1922.

I. E. NEWSOM, *Secretary*.

EXAMINATION FOR ACCREDITED VETERINARIANS

The next examination for graduate practicing veterinarians who desire to qualify so that they may apply the tuberculin test to cattle under the provisions of the uniform accredited-herd plan, will be held January 24, 1922, in certain States where such an examination has been requested by the State livestock sanitary authorities. Veterinarians who are not already "accredited" and who desire to avail themselves of this examination should indicate it by notifying the official in charge of livestock sanitary work in their State.

MISSOURI VALLEY VETERINARY ASSOCIATION

The winter meeting of the Missouri Valley Veterinary Association will be held at the Hotel Baltimore, in Kansas City, January 31 to February 2, inclusive.

R. F. BOURNE, *Secretary*.

AMERICAN LEGION ADOPTS TUBERCULOSIS RESOLUTION

The following resolution was adopted by the American Legion at its recent convention in Kansas City, Mo..

WHEREAS, the veterinary profession engaged in the alleviation of suffering and disease among livestock of this country contributed to the successful outcome of the late World War and is represented in this body, and

WHEREAS, a goodly number of those engaged in this profession are actively carrying on the accredited herd plan of bovine tuberculosis eradication instituted by the United States Department of Agriculture in cooperation with nearly every State in the Union, and

WHEREAS, Bovine tuberculosis is readily communicated to children by milk from tuberculous cows, and

WHEREAS, the death rate from tuberculosis exceeds the toll claimed by the World War; therefore be it

RESOLVED, That the work of tuberculosis eradication in the herds of cattle and swine now started in 45 States in cooperation with the United States Department of Agriculture be continued, and be it further

RESOLVED, That adequate appropriations be made by Congress to carry the completion of this work of tuberculosis eradication to the consequent health and well-being of this and future generations.

D. W. SHAFFER, *Chairman*.

COMMUNICATIONS

INVITATION TO CUBAN MEDICAL CONGRESS

President American Veterinary Medical Association,

Dear Doctor:

We beg to confirm the cablegram sent today to your Association; which reads as follows:

"A Fifth Annual Medical Congress, formed by 2,000 physicians, dentists, veterinarians, pharmacists, will be held in Havana from December 11 to 17. Last meeting Cuban Veterinary Association decided to invite member American Veterinary Association as guest of honor, paying all expenses trip and stay in Havana during week of Congress. Similar invitation extended European and American physicians by Congressional Committee. Extensive scientific and social program. Cable name of delegate, details by mail. Dr. B. Crespo, President, Veterinary Association."

The motives that have inspired the invitation that the National Veterinary Association of Cuba unanimously agreed to extend to your distinguished association in an extraordinary session celebrated the 10th inst., were to initiate an exchange of ideas and social relations between the Cuban Veterinarians and their colleagues in North America. The intellectual, commercial and political relations of the two countries being so closely united, we wish to take advantage of the opportunity offered by the coming National Medical Congress of Cuba, to express, in the person of the delegate that your Association may appoint, the consideration, appreciation and fellowship that we feel for your association and its distinguished members.

We follow with much interest the work and investigations of our brother veterinarians in the United States, and the progress made due to their untiring efforts. We only lament that owing to several difficulties that have arisen which prevented the setting of a definite date for the congress, this manifestation of our good wishes for our brother association has been so long delayed.

Nevertheless, we will consider it a great honor if you accept this invitation and will endeavor in every way possible to make the stay of your representative here in Havana a pleasant one.

We have been informed that some of the other invited dele-

gates will present scientific articles, and we hope your delegate will favor us with one likewise, which we know will prove interesting.

We trust that as soon as your delegate has been appointed you will advise us in time of the date of his leaving, so that we may meet him on his arrival here and arrange for the other details in connection with the arrival of a guest of honor.

We beg to advise that the first session of the congress will be held on the evening of December 11.

Awaiting the reply of your association to our invitation, in the name of the National Veterinary Association of Cuba, I beg to remain with best wishes,

Very truly yours,

ANGEL IDUATE, *Secretary.*

BERNARD J. CRESPO, *President.*

Havana, Cuba.

Dr. Ross P. Marsteller of College Station, Texas, was appointed by President Kinsley as the delegate of the A. V. M. A. to attend the Cuban Congress. Dr. Marsteller telegraphed President Kinsley that because of serious illness in his family he was unable to attend the Congress. President Kinsley then appointed Dr. A. Eichhorn of Pearl River, N. Y., to represent the A. V. M. A. at this meeting.

BOOST PUREBRED STOCK AND USE THE HORSE

To the Editor:

I have been reading with interest in the various veterinary bulletins and the JOURNAL of the number of the profession who are either in the purebred business directly or are advocating it to the farmers.

In my opinion there is nothing more befitting and interesting to the veterinarian as a side line than the breeding of either purebred or standard-bred stock or fowls. Even though it be on a small scale it will attract attention and inspire others with the desire.

The veterinarian should be an authority in his locality on breeds and breeding, that he may wisely and correctly advise those who seek such information. He should be keenly interested in the promotion of the breeding of better animals of all

breeds, also the promotor of any activity that will encourage the use of the horse, such as riding and driving clubs, polo playing, hunt clubs, etc. There is certainly no cleaner, better and invigorating sport than the use of the pleasure horse, either ridden or driven.

I am wondering how many of our profession have made an honest effort to sustain the horse? I have never allowed myself to discard him. While I, like the rest, have taken to the use of the auto (but for work only) I still keep my horse and the best I can get, using him every day when footing is good, in my downtown work. I find it a pleasure and a rest to get from behind a wheel and take hold of a real live one, either to ride or drive, and there is nothing that attracts more attention than a good horse—it's a good advertisement.

Why can we not, as a profession, give our best friend, the horse, a world-wide boost by using him for pleasure or business? I believe it will do more to bring him back than anything and the profession certainly owes it to him. I have never been in a community where there were not enough "horsey" people to start some kind of a riding or driving club.

Volumes have been written to boost the auto by those financially and otherwise interested. What have the veterinarians done to hold or promote the horse? He is one of their best assets in practice, aside from professional pride. Let us make a concerted effort to recover and "hold our own."

THOS. S. HICKMAN.

Sacramento, Calif.

Dr. J. N. Hornbaker, who has been stationed in Manila, P. I., for some time, writes that he is leaving for the United States, but does not know where he will be located.

Capt. D. B. Deininger of the Veterinary Corps, who is stationed at Camp Jones, Douglas, Arizona, made a splendid record in a horse show that was held there on November 19. He won one blue, one red and one yellow ribbon with the same horse entered in all three classes. He won first in the zig-zag jumping course, second in the four-foot jumping course and third in the equitation class. This is the third time he has won the jumping contest with his horse Ranger.

NECROLOGY

Dr. Jacob Albrechtsen, the world famous specialist on the sterility of farm animals, died at Copenhagen, Denmark, on September 11, 1921, at the age of 61. Before notice of his death reached this country, the recently appointed Committee on Membership of the A. V. M. A. had decided to recommend that Dr. Albrechtsen be extended an invitation to be our guest at the next annual convention in order to demonstrate his methods of diagnosing pregnancy and treating sterility, with the view of attracting a large attendance of practitioners.

Dr. Albrechtsen had suffered from a stroke of apoplexy some months ago and his death was due to a recurrence of this trouble. He entered the Danish Veterinary College at the age of 23 and graduated four years later. From the beginning he paid particular attention to the diseases of breeding animals and his books on sterility have been translated and published in several languages. His pleasing personality and his incessant endeavors to give practical demonstrations of his methods to those who visited him, made him beloved by all. It is to be regretted that the death of this leader among veterinarians prevents the consummation of the well-laid plans to give the veterinary practitioners of North America the opportunity of absorbing his inspiration and observing his technique, and as a result the livestock industry of the country is indirectly the loser.

Dr. Henry Prentiss Armsby, Director of the Institute of Animal Nutrition at the Pennsylvania State College, died October 19, at the age of sixty-eight years. Dr. Armsby was widely known throughout this country and Europe as one of the foremost exponents of research in the field of animal nutrition. As early as 1880 he published his *Manual of Cattle Feeding* which was the first treatise on that subject to appear in this country. It gave not only a summary of experiments and investigations in that field up to the time, but described the methods of investigation and supplied a stimulus which led to the rapid growth of experimentation in that line.

Dr. Armsby was born in Northbridge, Mass., September 21,

1853. He graduated from Worcester Polytechnic Institute, later receiving his Doctor of Philosophy degree from Yale University. For several years he was associated with the Connecticut Experiment Station as assistant chemist, and on the organization of a station in Wisconsin, he went there in charge of agricultural chemistry. When an experiment station was organized in Pennsylvania in 1887, he was called there as director, and was for many years also dean of the school of agriculture in Pennsylvania State College. His researches centered more and more around animal feeding, and in 1898 he entered into cooperation with the Bureau of Animal Industry of the U. S. Department of Agriculture, to conduct investigations in the fundamental principles of animal nutrition. This cooperation continued for about twenty-two years. The Department assisted the Pennsylvania Station in the building of a respiration calorimeter which was the first apparatus of its type for investigations with animals. A long series of investigations were carried out on the use of food by animals, considered especially from the standpoint of the income and outgo of energy, the conditions affecting the utilization of feeds, such as age and type of animal, amount and character of feed, environmental conditions, etc. The earlier experiments were made with cattle and later studies were made of the metabolism of the dairy cow.

In 1907 Dr. Armsby was relieved from the directorship of the Pennsylvania Station, at his request, in order that he might devote his whole time to this line of inquiry, and in that year an Institute of Animal Nutrition was established with him as director, in affiliation with the experiment station. This plan was continued to the time of his death.

Dr. Armsby published two other books which were made possible by his studies and his mature knowledge of the subject, namely, *The Principles of Animal Nutrition*, in 1903, and *The Nutrition of Farm Animals*, in 1917. He had been honored by many institutions, receiving the degree of Doctor of Laws from the University of Wisconsin in 1904, and the honorary degree of Doctor of Science from Yale University and Worcester Polytechnic Institute in 1920 and 1921, respectively. He was a member of the National Academy of Science, the Royal Society of Arts of Great Britain, and foreign member of the Royal Academy of Agriculture of Sweden. He was sent to Europe by the

U. S. Government near the close of the war, as a member of the Inter-Allied Scientific Food Commission.

Dr. Jacob Helmer, of Scranton, Pa., a veterinarian of national reputation, died on October 31, 1921, at the age of 62 years.

The doctor had not been in the best of health for the past few months. Returning from New York city, where he went to consult a specialist, he was taken ill while on the train. Mrs. Helmer was with him at the time. The doctor collapsed when he reached his home and his condition grew gradually worse until the end.

Jacob Helmer was of Hanoverian German parentage, the son of Henry and Christiana Helmer. He was born August 26, 1859, at Brandt, Susquehanna county, Pa., and in boyhood studied in common and graded schools at that place and also at Lanesboro and Jackson, finally pursuing for two years a classical and scientific course at the State Normal School at Oswego, N. Y.

After being a teacher in the public school four years, he became a commercial traveler. In 1885 he entered the Veterinary College in New York, now a part of New York University. Completing his course he began the practice of his profession in Susquehanna, Pa. Six months later he removed to Scranton, where he has lived in continuous practice save the time he returned to the University of New York to study. In March, 1894, he was graduated with the degree of Doctor of Veterinary Surgery.

In 1891, Dr. Helmer became veterinarian to the Delaware, Lackawanna and Western Railroad Company, which position he held until his death.

For fourteen years he was a member of the State Board of Veterinary Medical Examiners. He was a member of the Pennsylvania State Veterinary Medical Association, an ex-president and its secretary for two years. He was a member of the American Veterinary Medical Association and secretary of the division of associated faculties and examining boards for North America for two terms.

He was a member in high standing of the Masonic fraternity, the Benevolent and Protective Order of Elks and other orders.

His genial manner and his happy greeting in daily life will be missed by his many friends.

Dr. Nelson T. Gunn, of Butte, Mont., died suddenly November 28, of heart failure. Dr. Gunn was District Deputy State Veterinarian for the Butte district, and was one of the most highly respected and best known members of the profession in Montana. He was 41 years old, and had spent most of his life in Butte. He graduated from the Butte High School in 1897, and later studied medicine two years in Leland Stanford University. For a number of years he was connected with the City Health Office in Butte. In 1915 he graduated from the San Francisco Veterinary College and started practice in Butte. He entered the service of the B. A. I. the same year, and was in the Meat Inspection Service at South Omaha for about a year. In 1916 he again took up practice in Butte, and in 1917 was appointed District Deputy State Veterinarian, in which position he served with remarkable success until his death.

Dr. Gunn was a member of the American Veterinary Medical Association and of the Montana Veterinary Medical Association. He was President of the Montana Association in 1918, and Secretary in 1920. In 1920 he was appointed on the State Board of Veterinary Examiners, of which he was secretary at the time of his death.

Dr. Gunn's success in the State livestock sanitary work was due both to his personality and his professional ability, and was such that his place will be very difficult to fill.

GERMAN EFFORT TO REGAIN DRUG MARKET

According to the *Munchener Medizinische Wochenschrift*, the firm of E. Merek, of Darmstadt, has had a motion-picture film prepared for use in advertising in foreign countries the German chemical and pharmaceutical industry. Beginning with the raw material and leading up to the finished product ready for shipment, the manufacture of the most important drugs is shown, also the methods of producing therapeutic serums, with a glimpse of the inclosure in which the animals are kept. The film is in five reels and requires an hour and a half for its exhibition. It is evident that an effort is to be made by the German industry to regain the foreign markets which it held so largely before the war.

MISCELLANEOUS

FARM HORSES RAISE CASH

Ready cash being about as scarce as the proverbial hen's teeth, many a farmer in the Central West is casting about to find something to sell that will bring a substantial return. Horses have a cash value nearer normal than any other farm products, even though sold at sacrifice,—as they are, in many cases, with prices much lower than should be obtained. Men who are hard pressed for money are selling horses at \$75 to \$100 per head that other men in the same neighborhood, less crowded financially, would not sell for less than \$150 to \$175.

According to the farm calendar, the next considerable income will not be realized until after the first of the year. The sale of wheat, oats and such 1920 corn as farmers had carried over, only served to reduce their indebtedness at the banks. The majority have no cash crop yet to sell until the 1921 corn crop is harvested. This will be marketed as grain or through hogs. The cash from it will not be available generally until after January 1st. In the meantime winter clothing coal and other necessities must be bought.

Thousands of farmers are therefore selling off good work horses which they can ill afford to spare and which must be replaced before next spring. After the corn and hog crop goes to market, they will replace the teams which are being sold now with cheaper horses, buying either young horses or grade western stuff. These young or western horses will be broken in during February or March for next season's work, but will be less fit for heavy service than the work horses now being sold. It means that many farmers will need to use six horses on implements in 1922 where only four or five were used in 1920 or 1921.

EFFECT ON HORSE PRODUCTION

This dispersion of farm stock and the shortage of good young horses in the country is certain to cause a startling jump in prices as soon as the tide turns. In many sections, the situation is anticipated by a great increase in breeding, such as reported by Hammer Brothers at Cooperstown, N. D., who, with three sires available, bred 150 mares this season as compared with 40 last year. It is important, at the turn of the tide, that breeding

be directed to desirable, efficient types. This is of double import at such a time, for when the general trend swings toward horse breeding, in order to supply the necessary numbers, it is easy to lose sight of the fact that just plain "hosses" aren't wanted any more; that, to bring profit, the horse must be particularly efficient for the work he is to do.

The fact that farmers have been able to realize cash in time of great need, on the sale of some of their horses, emphasizes the sound economic position good horses and mules occupy in farm management. These men who have been pulled out of the hole by a timely sale of one or two work teams, will not forget what pulled them. Farm sentiment is setting strongly toward increased horse use and production, for present conditions convince even the skeptical that horses and mules are the "one best bet" for farm work. The sacrifice of good teams to the markets now will ultimately benefit all, for increased horse use in cities widens future markets for horses, hay and grains. If there's any one thing the farmer wants most it's a wider and better outlet for staple farm products.

WAYNE DINSMORE.

HUNGRY DUCKS

A new story is going around the financial district about an old southern negro who was asked by the proprietor of a store how he happened to need credit when he'd such a good cotton crop.

"De ducks got 'bout all dat cotton, sah," was the mournful reply.

"What do you mean the ducks got it?"

"Well, you see," explained the old man, "I sent dat cotton up to Memphis an' dey deducts the freight, an' dey deducts the storage charges, an' dey deducts the commission, an' dey deducts the taxes—yes, sah, de ducks got 'bout all dat cotton, an' dat's why I'm here."—*Selected*.

Dr. Seymour Hadwen, who has been connected for the past eighteen months with the reindeer investigations of the United States Biological Survey, at Unalakleet, Alaska, has arrived in Washington, D. C., with an abundance of scientific material, as a result of his studies.

Dr. Hadwen will spend the winter months getting his various lines of investigation in shape for early publication.

The National Veterinary Medical Association of Great Britain has had an exceptionally good year under the presidency of Dr. O. Charnock Bradley, who was re-elected for another year at the recent annual meeting. During the last year the membership increased from 372 to 1,115.

Dr. V. W. Woolen has recently purchased the practice of Dr. B. C. Hunt at Chebanse, Illinois; and has moved from Auburn to Chebanse. Dr. Hunt is now giving his entire time to control work of infectious diseases for the State of Illinois.

On November 22, 1921, Dr. Charles E. Cotton, of Minneapolis, was elected a director in the Minnesota Public Health Association, in appreciation of the excellent services he has been rendering his State as secretary of the Livestock Sanitary Board.

Dr. N. Nakamura of the Imperial Institute for Infectious Animal Diseases, Tokyo, Japan, is visiting this country with the view of studying our system and methods of organization. He will also spend some time in the Bureau of Animal Industry laboratories at Washington, D. C.

Dr. Cayetano López, official representative of the Bureau of Animal Industry of Spain, arrived in New York early in November and has been visiting the Lederle Antitoxin Laboratories at Pearl River, N. Y., the H. K. Mulford Laboratories at Glenolden, Pa., as well as those of the Bureau of Animal Industry in Washington. Dr. Lopez will remain in this country for several months, after which he will return to Spain and establish a national laboratory for the study of animal diseases and the preparation of biologics.

Dr. Carlos Pavia, Chief of the Veterinary Laboratories of the Department of Agriculture of Mexico, was a recent visitor at the Secretary's office.

Dr. Pavia brought a letter of introduction from Dr. Santa Maria who joined the A. V. M. A. at the recent meeting in Denver.

Dr. Pavia wrote out an application for membership in the A. V. M. A. and promised to use his best efforts to secure a number of members from our sister republic on the south.

JOURNAL

OF THE

American Veterinary Medical Association

FORMERLY AMERICAN VETERINARY REVIEW

(Original Official Organ U. S. Vet. Med. Ass'n.)

J. R. MOHLER, Editor, Washington, D. C.

A. T. KINSLEY, President, Kansas City, Mo. N. S. MAYO, Secretary, Chicago, Ill.
M. JACOB, Treasurer, Knoxville, Tenn.

Executive Board

GEO. HILTON, 1st District; T. E. MUNCE, 2nd District; S. E. BENNETT, 3rd District;
J. A. KIERNAN, 4th District; C. E. COTTON, 5th District; R. A.
ARCHIBALD, 6th District; CASSIUS WAY, Member at Large

Sub-Committee on Journal

S. E. BENNETT J. A. KIERNAN

The American Veterinary Medical Association is not responsible for views or statements published in the JOURNAL, outside of its own authorized actions.

Reprints should be ordered in advance. Prices will be sent upon application.

Vol. LX, N. S. Vol. 13

February, 1922

No. 5

ENROLLMENT OF VETERINARY STUDENTS

THE REGISTRATION of veterinary students in colleges in the United States and Canada for the college year 1921-1922, shown in the following table, has some encouraging features. The downward trend of the last few years, though not yet absolutely arrested, is at least partially checked, and there seems to be ground for the hope that the turning point is near at hand.

The number of freshmen enrolled for the current year is but 10 below the number for the preceding year, while the decrease from 1919-20 to 1920-21 was 188. The total decline of 176 is due largely to the disparity between the senior classes of the two years. If, however, we compare this year's senior registration with the number of last year's juniors, as should be done in order to see the situation in its true perspective, we observe that there are nine more seniors this year than there were juniors last year. The shrinkage between the lower classes of 1920-21 and the next higher classes of 1921-22 is much less than between 1919-20 and 1920-21.

	Fresh- men	Sopho- mores	Jun- iors	Sen- iors	Spe- cials	Totals	
						21-22	20-21
Alabama	10	5	14	12	.....	41	48
Colorado	18	15	17	17	1	68	82
Georgia	2	4	5	2	8	21	21
Indiana	10	13	21	25	.....	69	137
Iowa	26	17	18	19	.....	80	94
Kansas	10	13	22	10	4	59	71
Michigan	11	6	6	6	1	30	21
N. Y. State (N. Y. U.).....	5	0	2	5	2	14	23
N. Y. State (Cornell).....	14	17	27	17	.....	75	75
North Dakota ¹	3	3	.....	.....	.....	6	6
Ohio	14	13	25	35	.....	87	106
Oklahoma ¹	2	.....	.....	.....	.....	2	4
Ontario, Canada	13	22	35	18	.....	88	88
Pennsylvania	11	5	8	7	.....	31	30
St. Joseph	8	12	35	19	.....	74	102
Texas	5	1	2	4	.....	12	14
United States	3	4	9	4	.....	20	30
Washington State	7	2	7	6	.....	22	23
Totals	172	152	253	206	16	799	975
Totals 1920-21	182	281	197	296	9	.....	975

¹ Agricultural colleges giving two years in veterinary medicine. North Carolina has no students this session.

THE VETERINARIAN AND PUBLIC HEALTH

"THE Veterinarian Contributes to Public Health" is the title of an interesting article by J. Howard Beard, M. D., University of Illinois Health Service, which appeared in the June 15 issue of the popular publication, *The Nation's Health*.

In this article Dr. Beard discusses tuberculosis, anthrax, rabies, foot-and-mouth disease, milk sickness, pyogenic infections, endoparasitic infestations, and other diseases to which man and animals are alike susceptible. An interesting statement refers to the relation of veterinarians to the physicians, whom Dr. Beard designates as "allies in scientific research." The following quotations are from the article in *The Nation's Health*:

"Man domesticated the horse, the cow, the goat, the sheep, and the hog, which have fed and clothed and, in the case of the horse and ox, have borne him from place to place. They have broken and fertilized the soil which has grown grains, vegetables, and fruits more abundantly. Yet these noble animals, when ill, have proved to be the worst enemies of man. They have destroyed him with tuberculosis, killed him with anthrax, cut him off with glanders, filled his muscles with trichinæ,

racked his body with Malta fever, and loaded his intestines with tapeworms. They may become so dangerous to him when infected with anthrax that their meat, milk, hides, hair, or bristles may cause his death.

"That man should have some of the roses and avoid the thorns, that these best friends should feed and clothe him today and not destroy him tomorrow, is the contribution of the veterinary surgeon to public health. In his efforts to protect and to save animals, the veterinarian has consciously and unsuspectingly pointed to hidden paths by which man has been able to attain an average life nearer the normal limit of three score and ten. * * *

"The veterinary surgeon has contributed to public health by caring for animals infected with diseases which occur primarily in man; secondarily in animals. Both cattle and hogs may contract human tuberculosis and later transmit it to man. Cowpox and horsepox have been known for centuries. They probably originated with man and, according to many expert opinions, are modified variola or smallpox. In 1796, Jenner showed they are capable of producing an immunity to smallpox when inoculated in man. While the veterinarian has rendered distinct service in controlling these diseases in animals, in the case of man, more accidental inoculations would reduce smallpox among the unvaccinated without subjecting them to the danger of disfigurement of variola. * * *

"Veterinary science advances public health by stamping out endoparasitic diseases in livestock and in domestic animals, for which man may be the accidental, intermediary, or the only host. The more important internal parasites from the standpoint of public health are trichina, *Taenia solium*, *T. saginata* and *T. echinococcus*. * * *

"Discoveries in the field of veterinary science, with rare exceptions, have been helpful in the domain of medicine. Study of splenic fever in cattle and the demonstration of the relation of the tick to its transmission gave a new conception of the role of insects in the spread of disease and blazed the way for a better understanding of Rocky Mountain spotted fever, relapsing and South African tick fever in man. Investigation of surra in horses and nagana in cattle offered fertile suggestion in the study of human trypanosomiasis. Pasteur's immunization of chickens

against cholera and cattle and sheep against anthrax are the forerunners of inoculation against typhoid fever, cholera and plague. The world owes a great deal to the milkmaid who told the medical student, Edward Jenner, 'I can not take smallpox because I have had cowpox.' Her information led to the discovery of vaccination which has saved millions of human beings from death or disfigurement. Incidentally it reduces the cases of cowpox among domestic animals.

"The study of malnutrition, and its treatment in livestock and fowl has proved very helpful in dealing with scurvy, pellagra, rickets, and beriberi, and metabolic disease in man. Progress in animal feeding has usually created new possibilities for the better nutrition of man. Investigations of tumors in animals have shed additional light upon cancer.

"The veterinarian's work with young animals has aided the pediatrician in feeding and caring for infants. Treatment of abnormal parturition and of post-partum illness in animals has in many instances offered helpful hints to the obstetrician which have extended the boundaries of his subject and resulted in throwing greater safeguards around childbirth.

"In the battle against disease, the veterinarian and the physician are complements and allies. The former strives to prevent sickness among animals and to protect man; the latter seeks to preserve the health of man and incidentally saves animals. The one alleviates the sufferings of noble brutes; the other brings relief to his fellows. Both covet the glorious title of benefactor of humanity."

Although veterinary medicine is yet in its infancy compared with human medicine, its important achievements in the field of research have resulted to the advantage of all concerned in establishing a relationship of mutual respect and confidence between scientific investigators in these allied fields of usefulness. When we pause to consider the intimate relationship between animal and human maladies, it seems strange that there has not developed more rapidly a better understanding and closer working relation between practitioners in human and veterinary medicine. There is no doubt that they could be of mutual assistance in practice if a closer contact were established.

The essential contact between veterinary and human practitioners is possible through existing associations and popular sci-

entific publications. Medical and veterinary associations now hold meetings at regular intervals, but there has been little effort on the part of either to encourage affiliation. Seldom do physicians attend veterinary conferences and rarely do the names of veterinarians appear on the programs of the meetings of medical associations. It is true that several veterinarians are members of and not infrequently take part in the programs of the American Public Health Association, Society of American Bacteriologists, National Association for the Prevention of Tuberculosis, Society of Experimental Medicine and Biology, American Association for the Advancement of Science and similar organizations that welcome veterinarians to their meetings, but unfortunately too few of them avail themselves of such opportunities. It would be beneficial to both professions and to their clientele if the larger medical and veterinary associations were to include in their programs a short period for the discussion by physicians and veterinarians of subjects that are of mutual interest. It is hoped that the A. V. M. A. will be one of the first to make a move in this direction and adopt such a policy, not for any one year, but for each annual convention.

Dr. Beard is to be complimented on his splendid article and it is hoped that more such valuable contributions from physicians and veterinarians will appear in publications devoted to problems relating to disease, health and sanitation.

The Veterinary Journal (British) has reprinted in full, with extended favorable editorial comment, the paper by Dr. David S. White on "Our Profession," which appeared in our pages in April, 1921.

The average man would rather put on the regalia of some order and be known as the supreme grand hoozis than to know the contents of an encyclopedia or be a Ph. D.—*Journal of the American Medical Association*.

The Scottish Farmer reviews approvingly what it characterizes as "a humorous, striking, and essentially American circular," issued by the Horse Association of America, which "effectively upsets the theory that the horse is doomed by the increasing use of motor power."

BUREAU OF ANIMAL INDUSTRY INVESTIGATIONS ON BOVINE INFECTIOUS ABORTION¹

By E. C. SCHROEDER

*Superintendent of Experiment Station, United States Bureau
of Animal Industry, Bethesda, Maryland*

MY TASK is a discussion of the investigations of the Federal Bureau of Animal Industry on the common and widespread evil known as bovine infectious abortion. As the investigations have been long in progress and quite active in recent years, it may be well to say in advance that it will be impossible in the time at my disposal to enter into minute detail concerning them. And probably it is fair to assume that a minutely detailed account of the arduous, time-consuming and patience-trying technical work that has been done would prove less interesting or useful than a simple presentation of the facts that have been revealed or confirmed, together with a reference to their economic significance, provided enough is said about the evidence on which they are based to show that they are facts in reality and not merely in name.

Efforts to control infectious diseases before their etiology is known, at best, are general and commonly as unpromising as the chances that a marksman, with a vague idea of the direction in which he should aim, will make an effective shot in the dark. If enough ammunition is burned a lucky hit is occasionally made, but usually the ammunition is burned in vain, and the noise, smoke and confusion, even if stray shots do not prove unintentionally destructive, profit and please no one. What the marksman needs is light, and the light needed to combat infectious diseases is a reasonably clear knowledge of their etiology.

The prime etiological factor of bovine infectious abortion was discovered by Bang and Stribolt long before the more active investigation of the evil was undertaken by the Bureau of Animal Industry, and the discovery had been confirmed by McFadyean and Stockman in England, and MacNeal and Kerr and Ward Giltner and Good in America. But etiology is more than the recognition of the causative microparasite of a disease, and it remained to be determined how and when the parasite, the Bang

¹ Presented at the twenty-fifth annual meeting of the United States Livestock Sanitary Association, Chicago, Ill., Nov. 29-30, 1921.

bacillus, enters and leaves the bodies of its hosts or victims; whether it occurs elsewhere in nature than in the bodies of its victims; on what natural conditions its multiplication and perpetuation depend, etc., etc. Though some of the facts were known, so much remained in doubt that the available data led to wholly contradictory conclusions and fruitless controversies, and consequently when the question was asked, "How shall we combat abortion disease?" the answers ranged from a modest "I don't know" to suggested flushings and douchings that were apt to cost more per animal than the value of ordinary cattle per head, and the enactment of stringent laws and regulations which would have been more annoying and expensive to cattle owners than beneficial to their herds.

Confronted with this uncertainty and confusion, it required no prophet to foresee that an investigation of bovine infectious abortion would fail of its purpose unless vigorous efforts were made to amplify and clarify the existing etiological knowledge of the disease, and therefore etiological studies were at once planned and undertaken. An abundance of work also was done relative to treatment, general as well as specific; but I will speak of the etiological investigations first.

THE OCCURRENCE OF THE BANG BACILLUS IN THE BODIES OF CATTLE

The Bang abortion bacillus, like the tubercle bacillus, evidently is an obligatory parasite; it is known to multiply nowhere in nature but in the bodies of its hosts. In culture tubes, carefully sealed to prevent drying, it has been kept alive in the Bureau laboratories nearly three years; and in placentas of aborting cows, exposed under fly screens in shaded places in the woods during the colder months of the year, it has remained alive, in rare instances, as long as four months. In material discharged from the bodies of aborting cows, unless the conditions are exceptionally favorable for its preservation, the bacillus generally dies in less than a month, and its death is greatly hastened by sunlight. The weak resistance of the nonsporulating microparasite against natural germicidal forces implied that it could not perpetuate itself and serve as the cause of a widespread plague unless some special provision had been made by nature for its preservation, and the most reasonable provision

to look for was its long-continued presence in a dormant or a partly dormant state in the bodies of its hosts.

It was known that the bacillus occurs in the placentas of aborting cows and in different portions of the bodies of aborted fetuses. The investigations of McFadyean and Stockman indicated that it disappeared from the uterus within approximately a month after an abortion. The discovery had been made independently by the Bureau and by Smith and Fabyan that it occurs in the udders and milk of some infected cows. It remained to be determined how long it persists in the udder and, more definitely, how long it persists in the uterus and other portions of the reproductive organs. It remained to be determined whether it occurs in other parts of the body than the reproductive organs and the udder, and what its presence in other parts of the body signified. It also remained to be determined whether it occurs in the bodies of calves, heifers and bulls.

Today we know that the Bang abortion bacillus may, in rare cases, persist in the uterus two months after an abortion or a parturition, but that, as a rule, it does not persist more than two to three weeks; that it may persist in the udder and milk for greatly varying periods of time, from a few weeks to six or seven years; that the udders of more than 60 per cent of infected cows at some time harbor the bacillus; that when it is present in the udder it invades the uterus in a large proportion of cases during pregnancy and may be very abundant though the pregnancy is seemingly normal and ends in an apparently normal parturition; that it occasionally attacks and can be found in the reproductive organs and seminal fluid of bulls; that it may be present in the stomach fluids, livers and gastro-hepatic lymph glands of newly born, viable calves, and that all attempts to find it in the bodies of cows elsewhere than their udders, their uteruses during gestation and shortly after an abortion or a parturition, and the lymph glands associated with these organs, have failed.

It does not require much time or many words to state these facts. How much work was required to secure them may be evident to practical investigators, and even they are apt to fall short in their estimates. For example, the short statement that "abortion bacilli occur in the bodies of newly born, viable calves" rests on tests in which eleven calves were used, as follows: The calves were removed from their mothers, abortion-

infected cows, immediately after delivery, and not permitted to have access to anything that could lead to the postpartum ingestion of infected material; they were killed and sectioned with strict aseptic precautions, and tissues were gathered from all parts of their bodies for cultural and animal inoculation tests, and later, when positive results were obtained, they were confirmed by the subinoculation of experiment animals and culture tubes. If positive results had been obtained with the first two or three calves it would have settled the matter; but this was not the case; and when the results are negative the number of animals examined must be multiplied before the evidence is sufficient to give reasonable stability to a conclusion based on it. So with the brief statement that the abortion bacillus occurs nowhere in the bodies of cows but in their udders, pregnant or recently pregnant uteruses and associated lymph glands. The Bureau investigators who obtained the data that prove this statement can tell about the arduous task it was to kill and section abortion-infected cows so that their blood, spleens, livers, lungs, kidneys, serous membranes, synovial fluid, bone marrow, brains, spinal cords, muscles, uteruses, vaginas, Fallopian tubes, ovaries, etc., and lymph glands from all portions of their bodies could be tested. Not one or two cows, but a good many of them, because negative results require that the number of subjects examined must be large enough to insure that the exception which often is supposed to prove the rule has been eliminated.

Regarding the calves found to harbor abortion bacilli at birth—two out of eleven examined—it is noteworthy that one was the offspring of a cow that has never aborted and was recognized as a carrier and spreader of abortion bacilli only through the use of biological tests.

The examination of the bodies of calves for abortion bacilli was not confined to the eleven newly born calves, because the discovery that viable calves may harbor abortion bacilli at birth made it important to determine how long the calves of infected cows may remain carriers of the bacillus, particularly as the untenable hypothesis that "abortion bacilli may lie dormant in the bodies of cattle from birth until sexual maturity and then cause abortions" had been widely promulgated.

We know now, as the result of a large number of tests, that young cattle rarely harbor abortion bacilli in their bodies, and that, when they do so, they react to abortion tests. Many

calves react to such tests during the first weeks of their lives, but the reactions rapidly decline and disappear even if the calves are suckled by dams with infected udders, and, if they are protected against exposure to abortion infection after they are weaned, they become normal, healthy producers of calves when they reach sexual maturity.

As far as the Bureau's work has gone, the calves of abortion-infected cows, irrespective of whether they did or did not react to abortion tests during the first weeks of their lives, and irrespective of whether they were suckled by cows with clean or with infected udders, if they are protected against infection after they are weaned, are neither more nor less susceptible to abortion disease when they reach maturity than the calves of normal cows. This would indicate, if herd immunity against abortion disease actually develops, that it is less due to anything that calves inherit from their dams or acquire by ingesting infected milk during the milk-drinking periods of their lives, than to a fairly continuous exposure to abortion bacilli from birth until maturity, and possibly to their exposure particularly during the last two to three months before conception.

The significance of the exposure of cattle to infection with abortion bacilli during presexual life is a line of work that was greatly hampered by lack of funds. It was planned and well under way before our country entered the war. What happened to the cost of labor and feed after the war was entered is too well known to require discussion here, and what effect this had on the Bureau's experimental investigations may be judged when it is known, that the appropriations made for them did not take the reduced purchasing value of money into account. Work requiring a certain number of animals, planned when hay was plentiful at \$20 a ton and other forage equally cheap, was impossible without greatly increased funds when hay was scarce at \$40 a ton and other forage had increased proportionately in cost. The Bureau had no choice; it would have preferred to retain all its experiment animals and to continue its investigations undisturbed, but the pecuniary obstacles were too great to be mastered by scientific enthusiasm, and so it was forced to resort to painfully severe retrenchment. Many animals that had acquired great value because of the treatment to which they had been subjected and because their origin and history were fully known, and which it was desirable to keep

under observation, had to be disposed of, and, though no one was really to blame, the sorrow and regret this caused will not soon be forgotten.

The work on which the conclusion is based that the nonpregnant uterus is not a habitat of the abortion bacillus is somewhat varied in character. The first tests dealt with infected cows that had aborted or given birth to calves. Beginning directly after the abortion or the parturition, material was collected periodically on sterile swabs from the uteruses of such cows, and studied for the presence of abortion bacilli. The studies showed—and the number made cannot be stated in dozens and scores, as they amount to many hundreds—that abortion bacilli as a rule disappear from the uterus in which they were abundant at the time of an abortion or a parturition in from two to three weeks, though occasionally they persist somewhat longer and in exceedingly rare instances as long as nearly two months.

The second line of tests concerned cows into the uteruses of which cultures of abortion bacilli had been injected; the third, cows that were killed and all portions of their uteruses tested for abortion bacilli possibly hidden beneath the surface; and the fourth, cows that received copious intravenous injections of abortion bacilli and the uteruses of which were studied during subsequent estrual periods.

It was reasonable to conclude, though abortion bacilli could not be collected from a uterus on a cotton swab, that they might be present in or beneath the mucous membrane, or somewhere in the cotyledons, Fallopian tubes or ovaries, but this did not prove to be the case. Likewise, since the pregnant uterus is the favorite habitat of the bacillus, it was reasonable to believe that special activity of the reproductive organs would better enable it to maintain itself in the uterus, and that, therefore, the estrual period deserved special attention. It is fortunate that this period does not help the bacillus to live and multiply in the uterus, because, if it did, we would be forced to conclude that all cows with infected udders are prolific disseminators of abortion bacilli via their vaginas during a number of days every month.

The discovery that bulls may harbor abortion bacilli in their reproductive organs is also the product of industrious application; that is to say, it was not a fortunate stumbling on a fact.

As the belief was widely entertained that infectious abortion is carried from cow to cow by the bull, and that he introduces it at the time of copulation directly into the uterus, it was desirable to determine on what part of his sexual organs the bacilli occurred and how long they remained virulent. Hence, material was collected from many bulls shortly after they had served cows that reacted to abortion tests and were known to have infected udders, and this material was tested for abortion bacilli. The results in every case were negative, and it was found that the bacilli did not survive long even when pure cultures were introduced into the bull's sheath. This work was followed by postmortem examinations of reacting bulls, and with tests of all portions of their bodies for abortion bacilli in the manner in which the bodies of reacting cows had been tested, and the organism was finally discovered in an epididymal abscess.

Since then a number of bulls have been artificially infected with abortion bacilli, and studies have been made relative to the frequency with which bulls react to abortion tests, and the frequency with which lesions chargeable to abortion bacilli occur in the reproductive organs of reacting bulls; also studies which conclusively proved that bulls with infected reproductive organs may expel abortion bacilli with their seminal fluid.

The studies on the frequency with which bulls react to abortion tests dealt with several hundred bulls sent to an abattoir near Washington for slaughter. The bulls were first tested, and then, if they reacted, their genital organs were obtained and examined for lesions and abortion bacilli. Approximately 10 per cent of the bulls tested reacted, and approximately 10 per cent of the reacting bulls showed lesions of the reproductive organs from which abortion bacilli were isolated. The value of these studies is not that they give us a measure of the proportion of bulls that react positively to abortion tests or the proportion of reacting bulls that are carriers of abortion bacilli. The number of bulls tested, about 325, is too small to serve this purpose, to say nothing of the fact that bulls removed from herds and sent to the butcher are not representatives of those retained in herds to serve cows. Their value lies in the fact that they show that abortion bacillus disease of the bull's reproductive organs is not a wholly unique affection which practically may

be ignored, but an important condition that must be taken seriously into account in our efforts to combat infectious abortion, since it has been proved to be associated with the contamination of the seminal fluid.

MODES OF DISSEMINATION

Precise knowledge of the habitat of a parasite in the body of its host aids greatly in determining how it gets out of one host and into another; or, in other words, if the parasite is a pathogenic microorganism, how the disease it causes spreads from victim to victim.

The knowledge that the abortion parasite lodges nowhere in the living bodies of cattle but the udders and pregnant and recently pregnant uteruses of cows, the reproductive organs of bulls, and the digestive tracts and livers of newly born calves, and the lymph glands more or less intimately associated with the named organs, at once calls attention to the channels through which it is expelled.

From the udder the bacillus is expelled through the teat with milk, from the uterus with aborted fetuses, the placentas and discharges following an abortion or a parturition, and from the sexual organs of bulls with seminal fluid and other discharges. These three modes of expulsion have been definitely proved, and no doubt can be entertained about them. That the bacillus also may be expelled with the alvine discharges of infected calves and calves that drink infected milk seems probable but has not been definitely proved. It is a question on which experimental studies have been made, but the data obtained are not sufficient to justify a final answer. But, even if the answer eventually is affirmative, this mode of dissemination could hardly be characterized as important, as it would be confined to calves with infected mothers and would be closely limited to the time when the mothers are more or less actively expelling infected material from their uteruses.

The udder becomes infected in upward of 60 per cent of all infected cows, and the time during which it remains infected varies from a few weeks to six or seven years. An important fact about cows with infected udders is that in a large proportion of cases the infection extends to the uterus during gestation. Among the cows with infected udders thus far examined about

one-half were proved to harbor abortion bacilli in their uteruses at the time of parturition.

An infected udder does not mean that a cow has aborted or will abort, or that she has shown or will show symptoms of abortion disease, but it does mean that she is a dangerous animal to introduce into an abortion-free herd of cattle. Fortunately, after having made hundreds of tests, Bureau investigators have not yet found a cow with an abortion-infected udder that did not react in an unmistakable manner to the agglutination and complement-fixation tests for bovine infectious abortion.

The expulsion of abortion bacilli from the uterus via the vagina, as has already been stated, is not of long duration. It requires that the products of all abortions and the by-products of all parturitions and discharges following abortions and parturitions should be treated as dangerous material.

The discharges from the male sexual organs may be dangerous when the bull is permitted to run with the herd, and hence, in the control of bovine infectious abortion, it is desirable that he should have a separate pen, away from the cows, and that he should be permitted to serve cows only on neutral ground, or ground to which cattle do not have access at other times than during that of service. It may also be wise to segregate cows after they have been served by possibly infected bulls until all danger that infected seminal fluid may leak from their vaginas has passed, and to fasten them during such segregation in a way that will prevent them from eating anything that may have become soiled with leakage from their vaginas.

These statements concerning the bull may sound curious to those who continue to hold the once widely entertained hypothesis that bovine infectious abortion is transmitted from cow to cow largely by promiscuously used, unclean bulls. Neither the investigations of the Bureau nor other data on the subject support this hypothesis, which, in fact, has little support other than a general inclination to believe that the channels of infection for microscopic diseases must be the passages through which the attacked portions of the body communicate most easily or directly with its exterior.

It is regrettable that the time is too short to give a detailed account of the work that lies behind the statements this paper

contains. If it could be given it would inspire confidence and show why I am privileged to speak with unfaltering assurance.

Take a problem, for example, like the recurrence of abortion bacilli in the uterus of a cow with an infected udder at each of several successive, apparently normal parturitions. Think of the tests; milk tests, bloods tests, tests of placental material and uterine discharges, tests of calves, etc. Think of the watchfulness to prevent intercurrent infection from becoming a source of error; think of the experiment animals and culture tubes inoculated; think of the subinoculations of animals and culture tubes to validate the use of the results obtained as evidence. And, bear in mind, this work was not done with one or two animals, but with all the accessible cows that could be used as reliable material, until the number was large enough to justify the conclusion that at least half of all cows with infected udders have infected uteruses at the time of calving.

To reveal facts and to secure their recognition and use requires time and work and money; but facts are eternal things and the stock the world has on record is a criterion of its civilization; and probably the conviction that this is true, coupled with a desire to be real agents in the world's progress, has bound many able workers loyally to their poorly remunerated service in research establishments.

CHANNELS OF INFECTION

Microscopic as well as macroscopic parasites have favorite habitats in the bodies of their hosts, and the location of the habitat in most cases has nothing to do with the channels through which the host is invaded. Though this is a matter of common knowledge, many investigators of microparasitic diseases seem to cling to the fallacy that a close relationship exists between the attacked organs and the nearest channels from the exterior of the body through which they may be reached. Hence it is not surprising that it should have been assumed, or that the assumption should have gained wide credence, that the vagina is the common portal of entry for the microparasite of bovine infectious abortion, as the favorite habitat of the parasite is the pregnant uterus, where it attacks primarily neither the parent nor the offspring, but rather the medium through which the two are in communication.

It was early recognized by Bureau investigators that this

assumption lacked proper support, and that, if it were true, the community-owned or association-owned, more or less promiscuously used bull would prove an ideal agent to facilitate the spread of abortion disease among cattle. At the same time it was apparent that the use of a relatively small number of well-bred community or association bulls was vastly more economical than the use to only a fraction of their capacity of a larger number of individually owned scrub bulls. These and other reasons for studying the rôle of the bull in the spread of bovine infectious abortion were unmistakably urgent, and prompted the experimental tests of which the following is a brief outline.

Cows wholly free from abortion infection were given intra-uterine injections of pure cultures of abortion bacilli, placental material from cases of abortion, and material obtained from aborted fetuses before they were served by a bull; others were served by bulls which reacted positively to abortion tests; others were served by bulls which had shortly before served cows with infected genital tracts, and others by bulls both naturally and artificially infected which were expelling abortion bacilli with their seminal fluid. Quite a number of cows were used, many of which afterwards were proved to be susceptible to abortion disease; but in all cases the results failed to justify, in the least degree, the assumption that cows are infected with abortion bacilli via their vaginas and uteruses at the time of copulation, or that the bull, through copulation, is an agent in the spread of abortion disease. The cows not only failed to abort, but remained negative to abortion tests. The total number of calves produced was smaller than probably would have been the case if the uteruses of the cows had not been subjected to unnatural treatment and the bulls had not been somewhat deficient in potency because of the diseased condition of their sexual organs; but the cows that conceived passed through their periods of gestation in a normal manner, and the gestations terminated in the normal births of normal calves. In each case after service by infected bulls seminal fluid was collected from the vaginas of the served cows and tested for the presence of abortion bacilli, and the bacilli were repeatedly found in the seminal fluid of one naturally and one artificially infected bull. In each case the placentas and uteruses of the cows were tested after parturition, and no abortion bacilli were found.

Clearly, the uninjured sexual cavities of nonpregnant cows do not serve the abortion bacillus as channels of entry. Whether infection may occur via the vagina after pregnancy has been established has been given little attention by Bureau investigators, mainly because it is not an economically important matter, as such infection could hardly occur elsewhere than in an environment in which the bacilli are very abundant and in which they could easily enter through other channels. Work of other investigators seems to prove that the injection of abortion bacilli into the vaginas and uteruses of pregnant cows leads to abortions.

The community or association bull evidently is harmless so far as infectious abortion is concerned, and he is so without elaborate and troublesome disinfection of his genital organs, provided the precautions already suggested—a bull-pen, service on neutral ground, etc.—are observed.

As the udders of infected cows in many cases harbor abortion bacilli long periods of time, their transference from udder to udder during milking seemed reasonably possible. An experiment relative to the matter was made, but the number of animals used was too small and the time they were kept under observation too short to give the negative results obtained full validity, particularly as it was definitely proved that abortion bacilli introduced into the udder, through the teat with a milking tube, soon reach the uterus of a pregnant cow and cause abortion. This is a line of studies that was interrupted by inadequate funds, but the problem with which it dealt is one that is not urgently in need of a solution, because the transference of infection from cow to cow through milking would be practically impossible elsewhere than in an environment in which infection through other channels would certainly occur.

The one mode of infection—and I speak in this case of modes that require no artificial practices—that gives positive results is the ingestion of abortion bacilli. When a susceptible, pregnant cow is permitted to ingest abortion bacilli, either pure cultures or material from cases of abortion, she rarely fails to become a victim of the disease. In a large proportion of cases she afterwards aborts and reacts positively to abortion tests, and a large proportion of the cows that do not actually abort after having ingested abortion bacilli show other signs of the

presence of the evil, such as abortion bacilli in the placenta and the uterus at the time of parturition, the production of a weak calf, the occurrence of the bacilli in the udder, etc.

Ingestion, to judge from the investigations of the Bureau and other available data, seems to be the natural mode of entrance for the abortion bacillus into the bodies of its victims, and other conceivable natural modes of entrance, though they may not have been definitely disproved, plainly lack experimental evidence that proves their existence.

Letters are received occasionally from cattle owners describing in detail how the introduction of a new bull into their originally abortion-clean herds was shortly followed by a seriously large number of abortions, with absolutely no discoverable source of infection but the new bull, regarding which it was learned too late that his history could be traced to an abortion-infected herd. In cases like this we may feel confident, if all other sources of infection have been fully excluded—quite a difficult thing, by the way, when we deal with a common, widespread, insidious evil like bovine infectious abortion—that the bull was not only affected with abortion bacillus disease of his reproductive organs, but was also permitted to associate freely with the cows, so that leakage from his penis would lead to the contamination of their food and drink and to their infection through their digestive tracts.

TESTS FOR ABORTION DISEASE

The control measures indicated by the nature of the abortion bacillus, its habitats in the bodies of cattle, the manner and time of its expulsion, and by the channels through which infection occurs, are relatively simple. The real difficulties begin, as naturally would be expected with a disease in which the seemingly healthy carriers of its prime cause are exceptionally numerous, when the distinction between dangerous and safe animals must be made, and this brings us to a consideration of abortion tests.

Among the various tests which have been devised, two, the agglutination and the complement-fixation, alone possess a serviceable degree of efficiency, and the Bureau has found, after having made thousands of comparisons, that on the basis of reliability there is no choice between the two, but that the agglutination test, because of its much greater simplicity, is the one

that should be preferred, and this is a matter on which most investigators are in accord.

These tests have been criticised because they do not show that a cow will abort, and because some cows do not react after they have aborted, and for a number of other reasons; but such criticisms lose most of their weight if we view them with a rational comprehension of what the tests are and of the kind of information they can be expected to give.

To expect that an agglutination or a complement-fixation test for bovine infectious abortion should indicate that a cow will abort would be similar to requiring of the tuberculin test that it should show whether an animal will succumb to tuberculosis within several months; and to expect that every cow that has aborted should react to infectious abortion tests would be like expecting the tuberculin test to show the presence of any disease with necrotic, caseous or calcareous lesions. An abortion is, strictly speaking, the supreme or superlative event in bovine infectious abortion, and not an essential event. We may reasonably say that as all children attacked by diphtheria do not die, so all cows attacked by bovine infectious abortion do not abort; and we may also say that as all diphtheroid lesions are not due to Loeffler's bacillus, all abortions among cows are not due to the Bang bacillus.

The Bang bacillus may enter the body of a cow so shortly before an abortion that a reaction does not occur until some time afterwards, and it is not difficult to believe that in rare instances, owing to recondite or abstruse causes, cows infected with bovine infectious abortion fail to react, just as some tuberculous subjects fail to react to tuberculin. But on the whole, if the agglutination and complement-fixation tests are properly made, they show with an amazing degree of perfection whether an animal is or has been harboring abortion bacilli in its body.

Some of the noteworthy results obtained with the agglutination test by Bureau and other investigators are as follows: If it can be proved that the udder of a cow harbors abortion bacilli, the reaction will be positive in a dilution of 1 to 200 or more; in reactions obtained respectively with milk and blood serum from the same cow, though they may be equal, that of the serum usually is a little stronger; colostrum from infected cows often reacts in enormously high dilutions; the calves of reacting cows

often react, sometimes higher than their dams, but the reactions are passive and do not persist long even when the calves are suckled by cows with infected udders; when two tests are made some time apart, a declining reaction, particularly if it is below 1 to 200, signifies that the animal probably no longer harbors abortion bacilli in its body; bulls which harbor abortion bacilli, in all cases so far tested, react positively, etc.

A reaction in a dilution of 1 to 200, or 1 to 25, or 1 to any other number, as the expression is used in this paper, means that the bacilli in a definitely measured volume of a standard suspension of abortion bacilli are agglutinated by adding to it an amount of serum which is proportioned to the volume of the suspension as the smaller number is proportioned to the larger; thus, a reaction in a dilution of 1 to 200 would mean that the volume of the suspension was 200 times as great as the volume of serum added to it, and, in a reaction of 1 to 25, that the volume of suspension was 25 times as great as that of the serum; consequently, if the volume of the suspension was 1 c.e., that volume of serum in the one case would be 1 divided by 200, or 0.005 c.e., and in the other, 1 divided by 25, or 0.04 c.e.

Reactions vary greatly with material obtained from different cattle that are known to harbor abortion bacilli, and may reach the enormous height, when blood serum is tested, of 1 to 3,200, and when colostrum is tested, of 1 to 25,000. Think a moment of the potency of the specific agglutination agent indicated by these figures. Blood serum and colostrum chemically are complex substances of which, at most, a very small fraction can be supposed to be the agglutination agent; and yet the serum at times agglutinates the bacilli in 3,200 times, and the colostrum in 25,000 times, their own volume of suspension.

What measure of agglutinating power of the blood serum should be regarded as a certainly positive bovine infectious abortion reaction, whether it should be higher than 1 to 50 or as low as 1 to 10, has not been definitely determined and is a subject on which dogmatic statements would be dangerous before all matters relating to the test have been so standardized that a satisfactory comparison can be made between the reactions obtained by different investigators.

The Bureau investigators are strongly inclined to believe, on the one hand, that even a very low agglutinating property of

blood serum for abortion bacilli should be viewed with suspicion, and, on the other, that a declining reaction, particularly if it drops below and remains lower than 1 to 200, indicates that an animal is safe so far as the dissemination of abortion bacilli is concerned.

TREATMENT AND PREVENTION

Treatment of infectious abortion with drugs or chemical agents, either internally or externally, has given little, or no, or only false encouragement. The Bureau's work in this connection, though not abundant, proves—doubtless a matter of common experience—that the more insidious and chronic a disease is, the greater the chances are that those who attempt to treat it may go astray in their valuation of the events that follow treatment, more particularly if the treatment is given under the supervision of a conscientious, capable person who greatly improves the sanitary conditions under which his subjects live, without taking into consideration how much the consequently more hygienic environment may benefit both the affected and the exposed subjects.

Unquestionably it is economical to give proper treatment to cows that have aborted, or that do not clean properly, or that are afflicted with other troubles of the reproductive organs and functions; but such treatment should not include attempts to disinfect the uterine and vaginal cavities by irrigating them with strong germicidal solutions, because such attempts will prove futile and can not be made without serious danger of doing harm. The modern and rational idea of wound treatment should be applied to the treatment of the injured or diseased uterus, and that means the removal of dead and foreign material on which saprophytic and facultative pathogenic microorganisms can feed and multiply, and not the further devitalization of injured and diseased tissues.

Treatment with abortion bacilli, killed and living, alone and in combination with antiserum, has been tried with varying and contradictory results. The Bureau's work on the subject is restricted to the use of killed cultures among pregnant and living cultures among nonpregnant cattle.

In one large herd numbering over 1,000 head of cattle, of which 911 remained under observation one year and 453 a second year, the results from the injection of live organisms before con-

ception were as follows: Treated cattle, first year, 13.12 per cent of abortions; second year, 10.29 per cent. Untreated cattle, first year, 17.7 per cent of abortions; second year, 14.09 per cent. The treated animals in the first year numbered 617 and in the second 311, and the untreated in the first year 294 and in the second 142.

Regarding this herd it should be said that it was located a long distance from Washington, and could not be kept under the close, continuous, personal supervision of those who planned the work, that is desirable in an experimental test, and unfortunately the uninterrupted services of a trained inspector to immediately supervise it failed for reasons over which the Bureau had no control.

The live organism treatment, or attempted immunization, however, in both years, though it was not fully satisfactory, evidently was not attended or followed by ill effects. In both years the proportion of abortions among the treated cattle was a little lower than among the untreated, and the percentages of sterility which developed in the two groups during the time they were under observation were practically alike.

An examination of the available data on the use of living cultures of abortion bacilli to produce immunity shows three things: (1) That very few tests have been made under strict experimental conditions; (2) that the number of abortions among cattle that have received injections some time before conception drops with a noteworthy frequency to approximately 6 per cent, no matter what it may have been before immunization was attempted; and (3) that the per cent of abortions among treated cattle is lower as a rule than among untreated cattle kept under the same conditions.

In connection with this statement it may be interesting to record the observations made in a large, privately owned herd of dairy cattle, which the Bureau includes among its investigational material, and to give a synoptic account of one precisely made experimental test on immunization.

The dairy herd numbers about 200 cattle; it has long been infected with abortion, and the current number of abortions was greatly reduced by raising the heifer calves born in the herd to replace cows as they outlived their usefulness. All the cattle have been repeatedly tested with abortion tests; the proportion

of reacting cows is relatively small, and the reacting and the nonreacting animals are not permitted to come into contact with each other. In this herd about 6 per cent of the cows have aborted during the past year, and the proportion of aborting cows among those that react is about equal to the proportion among those that do not react.

We have here this factor of about 6 per cent which is frequent among abortion-immunized cows. Would it not be pertinent to ask whether it is a figure that approximately indicates the number of abortions among cattle that are due to other causes than the Bang bacillus? We might lightly dismiss this question by saying that we are here face to face with the inefficiency of abortion tests; but let us not be too hasty. It would be surprising if no other causes than the Bang bacillus existed for abortions among cattle, animals superlatively artificial because of the kind of selection that has been practiced in breeding them for human, utilitarian purposes without giving too much thought to what nature intended them to be; and it would likewise be surprising, when we bear in mind how complex the reproductive functions are, if there were no other causes for abortions among cattle than microparasites. Some of the Bureau investigators have determined to devote much time and study to this phase of the abortion question in the future.

And now for the test, which does not include a large number of animals, but was made in harmony with true experimental standards.

Twenty-three cattle, part of a drove of 66, not one of which, according to the tests that could be made, was infected with bovine infectious abortion, were divided into three groups. Eleven received subcutaneous injections of pure living cultures of abortion bacilli about two months before they were served by bulls; 4 received repeated injections of killed cultures of abortion bacilli after they had become pregnant; and 8 were retained untreated, as checks or controls. The 23 cattle were equally and similarly exposed to abortion infection; the exposure was via the digestive tract, or the kind of exposure that would occur in nature, and the material used for the exposure was obtained from actual cases of infectious abortion.

Of the eleven cows treated with live organisms before conception, 10 calved normally in all respects and 1 aborted.

Of the 4 given dead-organism treatment after becoming pregnant, 2 calved normally and 2 aborted.

Of the 8 controls, 7 aborted.

The cattle of the first group, those which received treatment before they were served by a bull, were kept under further observation until they had produced an additional 15 calves. They suffered no breeding troubles, such as retained placentas, sterility, etc.

The number of animals in the second group, only 4, is too small to permit drawing the conclusion that treatment with dead organisms in some measure protects gravid cows; but the difference of 1 abortion among 11 cattle and 1 abortion among 8 can leave little doubt that a serviceable degree of immunity against abortions can be engendered by subcutaneous injections, prior to conception, of living abortion bacilli.

A SEARCH FOR OTHER CAUSES OF ABORTION AMONG CATTLE

A search for other specific causes of abortions among cattle has not been neglected, and Bureau investigators could relate at great length stories similar to those which other investigators have told about microorganisms isolated from the products of abortions and the uteruses of cows that have aborted. Bacilli of various kinds, different types of micrococci, and spirilla or vibrio have been found repeatedly; but when their pathogenicity has been tested in accordance with widely recognized and accepted and required bacteriological standards, not one shred of evidence has been obtained to prove them true etiological factors of bovine abortions. What rôle such microorganisms may have as causes of the sequelæ of infectious abortions, and of other, possibly independent, abnormal processes in the reproductive organs, is far from clear and merits careful study.

BOVINE INFECTIOUS ABORTION AMONG SWINE

At times the Bang bacillus attacks sows and causes abortions among them. Attention has been given to this matter, but as yet little progress has been made. The Bureau's work indicates that swine are strongly resistant against ordinary strains of the abortion bacillus, but is not conclusive on the subject. So far we have been able to procure only two strains of the bacillus isolated from outbreaks of abortion among swine, and these strains, though in other respects like those obtained from cattle, are not wholly like them in the lesions they cause in guinea-

pigs. One of the strains causes lesions much grosser in character, and the other has the peculiarity of causing orbital tumors in a large proportion of guinea-pigs injected with it, which lead to a crowding forward and an extreme protrusion and the gradual destruction of the eye. While it is remarkable that both strains of the bacillus derived from swine should vary more from the general type obtained from cattle than strains from cattle vary from one another, we must remember that it is only two strains we have studied. One of the strains caused abortions in both a sow and a cow, and in this case the sow was exposed through ingestion, and the organism was afterwards recovered from her uterus and the aborted fetuses. With serological tests both strains act precisely like ordinary abortion bacilli.

It will be apparent from what I have said that much work on infectious abortion has been done and that valuable results have been obtained, and it will also be apparent that much remains to be done. The work is peculiarly of a kind that requires time, diligent application, long-sustained interest and considerable expenditures of money. I hope that the outline presented will convince you that what has been accomplished justifies that the work should be continued and liberally financed.

BUSINESS TAKES GOVERNMENT PERSONNEL

An editorial in the *Washington Post*, based upon the Civil Service report, says: "Business has a keen scent, and it tracks down its man and lures him to its own service just at the time when the display of his abilities has shown that he is about to become of greatest value to the Government. The drift of personnel from an official to a business career is at some periods stronger and more noticeable than at others, but the outlet is generally wide open and is never closed up. It is unnecessary to point out how undesirable, from a public point of view, such a leakage is. If the Government were a wise and farseeing employer, it would hold out such inducements to those who enter its service that the tendency to slip away from it would be scarcely, if at all, existent and the exodus of its best and brainiest officers would be stopped or greatly checked. The annual report of the Civil Service Commission, just published, emphasizes the danger which threatens the public service because of this continuous drain on its human resources."

INVESTIGATIONS ON THE USE OF VACCINES MADE FROM BACILLUS OVISEPTICUS¹

By I. E. NEWSOM and FLOYD CROSS

Colorado Experimental Station, Fort Collins, Colorado

THE SKEPTICISM regarding the value of commercially prepared vaccines against hemorrhagic septicemia, which has been aroused by the publication of Nebraska Research Bulletins Nos. 17 and 18 (1), has led practitioners and investigators to the point of inquiring, not only whether there is value in commercially prepared vaccines for these diseases, but whether the whole practice of immunization against them is on a secure basis. Judging from the comments which have appeared in recent publications, there are those who are not only doubtful of the value of commercially prepared vaccines, but are even questioning the possibility of producing an efficient vaccine by present methods. It seemed to us at this time that any addition to our knowledge which is based upon controlled experiments might be received with interest even if of no permanent value. Therefore we have collected some experiments done by us during the past four years and merely present them for your consideration, realizing that they are somewhat incomplete and are too few for final conclusions.

Ever since the classical work of Pasteur (2), in which he seemed to show that an efficient vaccine might be produced against chicken cholera by allowing the cultures to become avirulent and then using them alive, much interest has been exhibited in an attempt to produce immunizing agents against all of the hemorrhagic septicemias.

Kitt (3), following Pasteur, came to the conclusion that the Pasteur method was not only inefficient but dangerous, as there was always a possibility of transmitting the disease.

In this country possibly the most painstaking work has been done by Hadley (4), who found that strains of chicken cholera organisms failed in their capacity to stimulate the production of immunizing substances in rabbits and fowls. His earlier

¹ Presented at the fifty-eighth annual meeting of the American Veterinary Medical Association, Denver, Colo., September 5-9, 1921.

work seemed to indicate that no value might be expected from the use of an organism killed by heating at 63° C. for 20 minutes, but that one of his strains, which was avirulent, could be used alive on rabbits, and did give a considerable degree of protection. In a later bulletin he made the discovery that a considerable immunizing value could be had even by using dead organisms.

Since our work has dealt entirely with *Bacillus ovisepticus*, we prefer to discuss the work done by other investigators with this organism, although the literature in the whole field of hemorrhagic septicemia immunization is very inviting.

In 1898 Lignieres (5), after having investigated the disease known in Argentina as lombriz, developed a polyvalent vaccine made by growing the organisms at higher temperatures than normal, thereby reducing their virulence. With this he claimed considerable success.

Later, in 1910, Miessner and Schern (6), working in Germany, tried the method of Lignieres, but with rather unsatisfactory results. They then produced a bacterial extract by grinding the organisms and claimed from this procedure a considerable success. They were also able to obtain some protection by the use of an antiserum.

A survey of the literature does not show that any one of these procedures came into common use in the countries mentioned. Since the use of a killed organism had become common in this country for protection against hemorrhagic septicemia in cattle and swine, it was only to be expected that the same type of immunizing substance should be tried on sheep. Our work, therefore, has dealt with the value of the killed organism first, and finally of a live culture.

EXPERIMENTS ON RABBITS

Experiment No. 1

Our first experiment was conducted with rabbits. The culture used in this experiment was our No. 23. The vaccine was produced by growing the organisms in bouillon for 48 hours, then heating in a water bath at 60° C. for 30 minutes, after which 1 $\frac{1}{2}$ of 1 per cent of phenol was added. Vaccines grown in this way usually contained between 7 and 10 billion organisms per cubic centimeter. The determination of the minimum lethal dose was made according to Table 1.

TABLE 1.—TO DETERMINE THE MINIMUM LETHAL DOSE FOR RABBITS.

Date	Number	Weight (Grams)	Amount (C. C.)	Result
May 2, 1918	1	550	0.25	Death
do.	2	550	.1	do.
do.	3	550	.02	do.
do.	4	550	.01	do.
May 3, 1918	5	825	.01	do.
do.	6	716	.002	do.
do.	7	685	.001	do.
do.	8	590	.0001	do.
May 7, 1918	9	570	.0001	do.
do.	10	830	.00001	do.
do.	11	685	.000001	do.
do.	12	885	.0000001	Lived

Five rabbits were then taken and each given 0.5 c.c. of the vaccine. Eleven days later these rabbits were given amounts varying from one thousandth to one ten millionth of the culture. Five rabbits were given the same amounts of the culture and were used as controls. All rabbits died. At a slightly later time five rabbits were again given 0.5 c.c. of the vaccine and 17 days later all were given one millionth of 1 c.c. of the culture. Only one control was used, which was given the same amount as the others. The result was that all of the vaccinated rabbits died and the control lived. This experiment indicated that the vaccine produced by us had no immunizing value in rabbits against strain No. 23.

TABLE 2.—TO DETERMINE THE VALUE OF VACCINE FOR RABBITS

No.	Weight (Grams)	Vaccine		Culture		Result
		Date	Amount (C. C.)	Date	Amount (C. C.)	
1	710	May 2, 1918	0.5	May 13, 1918	0.001	Died
2	555	do.	.5	do.	.0001	do.
3	540	do.	.5	do.	.00001	do.
4	885	do.	.5	do.	.000001	do.
5	545	do.	.5	do.	.0000001	do.
6	.....	Control	.....	do.	.001	do.
7	.....	do.	.....	do.	.0001	do.
8	.....	do.	.....	do.	.00001	do.
9	.....	do.	.....	do.	.000001	do.
10	.....	do.	.....	do.	.0000001	do.
11	410	May 26, 1918	.5	June 12, 1918	.000001	do.
12	410	do.	.5	do.	.000001	do.
13	410	do.	.5	do.	.000001	do.
14	410	do.	.5	do.	.000001	do.
15	410	do.	.5	do.	.000001	do.
16	410	Control	.....	do.	.000001	Lived

EXPERIMENTS ON SHEEP

Experiment No. 1

Our preliminary experiments having shown that not much was to be expected from rabbit inoculations, we were curious to know if any immunizing value might be had in sheep. We, there-

fore, selected 5 lambs weighing about 50 pounds each, and gave each of them 2 c.c. of a vaccine made as previously described. Eleven days later 3 of the vaccinated lambs were given intravenously 5 c.c. of a 48-hour bouillon culture of strain No. 23; one was given 10 c.c. and one 1 c.c. A control was given 5 c.c. The vaccinated sheep receiving 10 c.c. of the culture and one of those receiving 5 c.c. was found dead on the morning following the injection. The one receiving 1 c.c. died eleven days later, and another receiving 5 c.c. died on the 12th day. The control having received 5 c.c. died on the sixth day. One of the vaccinated sheep survived.

TABLE 3.—TO DETERMINE VALUE OF VACCINE FOR SHEEP. (EXPERIMENT NO. 1).

No.	Vaccine		Culture		Result
	Date	Amount (C. C.)	Date	Amount (C. C.)	
1	June 1, 1918	2	June 12, 1918	5	Death, 1 day.
2	do.	5	do.	5	Death, 12 days.
3	do.	5	do.	5	Very sick for 2 weeks; recovered.
4	do.	10	do.	10	Death, 1 day.
5	do.	1	do.	1	Death, 11 days.
6	Control	.....	do.	5	Death, 6 days.
7	do.	.....	.....	0	Lived.

Experiment No. 2

Having shown that a vaccine made by us was of little value, we set up this experiment in which we used two well-known commercially prepared vaccines. Three lots consisting of 3 sheep each were selected. Lot No. 1, consisting of 3 animals, was given 2 c.c. of a commercially prepared vaccine. Lot No. 2 was treated in the same manner with a commercially prepared vaccine from another source. Lot No. 3, consisting of 3 animals, was used as a control. Twelve days after vaccination one animal in each lot was given 10 c.c. of a 48-hour bouillon culture of our strain No. 23, one was given 5 c.c. and one 1 c.c., all intravenously. All three of the animals receiving 10 c.c. were found dead the following day. Of the lambs receiving 5 c.c., the one in lot No. 1 died three days after the injection; the one in Lot No. 2 sickened for one week but recovered; the one in Lot No. 3, being the control, died on the sixteenth day. Of the ones receiving 1 c.c., one in Lot No. 1 sickened and always remained lame in the left hind leg; one in Lot No. 2 sickened and remained lame in the right hind leg for several weeks; the control sickened and remained lame in the left hind leg for two weeks.

TABLE 4.—TO DETERMINE THE VALUE OF VACCINE FOR SHEEP. (EXPERIMENT NO. 2.)
PEN No. 1, COMMERCIAL VACCINE No. 1.

No.	Vaccine		Culture		Result
	Date	Amount (C. C.)	Date	Amount (C. C.)	
1	July 26, 1918	2	August 7, 1918	10	Death, 1 day.
2	do.	2	do.	5	Death, 13 days.
3	do.	.....	do.	1	Sickened and always remained lame in left hind leg.

PEN No. 2, COMMERCIAL VACCINE No. 2.

1	July 26, 1918	2	August 7, 1918	10	Death, 1 day.
2	do.	2	do.	5	Sickened for a week but recovered.
3	do.	2	do.	1	Sickened and lame in right hind leg for several weeks.

PEN No. 3, CONTROL, NO VACCINE.

1	.....	.....	August 7, 1918	10	Death, 1 day.
2	.....	.....	do.	5	Death, 16 days.
3	.....	.....	do.	1	Sickened; remained lame in left hind leg for 2 weeks.

Although it would be presumptuous to conclude on such a small number of animals, the appearance here purely on the face of the results is that some slight protection was given by commercially prepared vaccine used in Lot No. 2.

Experiment No. 3

It having seemed up to this time that little value might be expected from an organism killed by heat, in the preparation of the vaccine for this experiment, we omitted the heating and added phenol to $\frac{1}{2}$ of 1 per cent. Four lambs were then vaccinated as follows: No. 1 was given 10 c.c. of this vaccine, No. 2, 5 c.c., No. 3, 2 c.c. and No. 4, 2 c.c. at each of two injections, 12 days apart. Fourteen days after vaccination, each of the vacci-

TABLE 5.—TO DETERMINE THE VALUE OF VACCINE FOR SHEEP. (EXPERIMENT NO. 3.)

No.	Vaccine		Culture		Result
	Date	Amount (C. C.)	Date	Amount (C. C.)	
1	Dec. 23, 1918	10	Jan. 11, 1919	10	Lived.
2	Dec. 30, 1918	5	do.	10	Lived.
3	Dec. 30, 1918	2	do.	10	Death, 1 day.
4	Dec. 30, 1918	2	Feb. 13, 1919	10	Lived.
	Jan. 11, 1919				
5	Control	.....	do.	10	Death, 1 day.
6	do.	.....	do.	5	Lived.
7	do.	.....	do.	1	Lived.

nated animals was given 10 c.c. of our culture No. 23 intravenously. Three controls were selected, one given 10 c.c., one 5 c.c. and one 1 c.c. Of the vaccinated animals only No. 3, the one which had received 2 c.c. in a single dose, died. Of the controls, the one receiving 10 c.c. died, the other two survived.

On the face of these results it would seem that some immunizing value was had by the use of phenolized cultures when given in greater dosage than 2 c.c.

Experiment No. 4

In this experiment it had been decided to give the injection of the virulent culture subcutaneously, since all previous work had been done intravenously. Five lambs were vaccinated with a phenolized culture as follows: No. 1 was given 2 c.c.; No. 2, 5 c.c.; No. 3, 10 c.c.; No. 4, 2 c.c. at each of two injections, and No. 5, 2 c.c. at each of three injections. Twenty-eight days after the first injection was administered all were given 20 c.c. subcutaneously. Of two controls which had been selected, three days previous to these injections, the one receiving 20 c.c. of the virulent culture died in one day and the one receiving 10 c.c. sickened but recovered. All of the vaccinated animals having survived the 20 c.c. of the culture, another control was given 20 c.c. on the following day, which animal sickened but survived. Unfortunately this circumstance seems to invalidate any conclusion that might be drawn from this experiment.

TABLE 6.—EXPERIMENT No. 4, SUBCUTANEOUS INOCULATION.

No.	Vaccine		Culture		Result
	Date	Amount (C. C.)	Date	Amount (C. C.)	
1	Jan. 18, 1919	2	Feb. 15, 1919	20	Lived.
2	do.	5	do.	20	do.
3	do.	10	do.	20	do.
4	Jan. 18, 1919	2	do.	20	do.
5	Jan. 25, 1919				
6	Jan. 18, 1919				
7	Jan. 25, 1919	2	do.	20	do.
8	Feb. 1, 1919				
9	Control	.....	Feb. 12, 1919	20	Death, 1 day.
10	do.	.....	do.	10	Sickened, but re-
11	do.	.....	Feb. 16, 1919	20	covered, do.

Experiment No. 5

In this experiment the vaccine was a phenolized culture as formerly, the strain used being our No. 33. This experiment is presented more especially to show what happens when the minimum lethal doses are not determined, although it may be

added that the probability is that the lethal dose of this culture was not greatly below 10 c.e., which would indicate that no considerable degree of immunity had been obtained.

TABLE 7.—EXPERIMENT No. 5.

No.	Vaccine		Culture		Result
	Date	Amount (C. C.)	Date	Amount (C. C.)	
1	Jan. 17, 1920	10	Jan. 30, 1920	10	Death, 1 day.
2	do.	5	do.	10	do.
3	do.	2	do.	10	do.
4	Jan. 17, 1920	2	Feb. 2, 1920	10	do.
5	Jan. 27, 1920		Jan. 30, 1920	10	do.

Experiment No. 6

The work up to this time had been so conflicting that we determined to find out whether vaccine had any protective value, not only as determined by injection of a lethal dose of culture, but also as measured by agglutination. The culture used was our strain No. 33.

TABLE 8.—EXPERIMENT No. 6.

No.	Date	Vaccine, subcutaneous	Culture, intravenous	Agglutination							Remarks
				1:10	1:25	1:50	1:100	1:250	1:500	1:1000	
		(c. c.)	(c. c.)								
1	Feb. 2, 1920	2	2	—	—	—	—	—	—	—	
2	do.	2	2	+	+	+	+	—	—	—	
1	Feb. 9, 1920	5	5	+	+	+	+	—	—	—	
2	do.	5	5	+	+	+	+	—	—	—	
1	Feb. 16, 1920	10	10	—	—	—	+	—	—	—	
2	do.	10	10	—	—	—	+	—	—	—	
1	Feb. 24, 1920	20	20	—	—	—	+	—	—	—	
2	do.	20	20	—	—	—	+	—	—	—	
1	March 3, 1920	2	2	—	—	—	+	—	—	—	
2	do.	2	2	—	—	—	+	—	—	—	
1	March 12, 1920	5	5	—	—	—	+	—	—	—	
2	do.	5	5	—	—	—	+	—	—	—	
1	March 19, 1920	10	10	—	—	—	+	—	—	—	Sick on day following; temperature 106.8.
2	do.	10	10	—	—	—	+	—	—	—	Sick on day following; temperature 105.8.
1	April 2, 1920	15	15	—	—	—	+	—	—	—	Apparently normal; temperature 105.4.
2	April 3, 1920	15	15	—	—	—	+	—	—	—	Depressed, dull; temperature 106.4.
1	April 15, 1920	—	—	—	—	—	+	+	—	—	
2	do.	—	—	—	—	—	+	+	—	—	
1	May 4, 1920	—	—	—	—	—	+	+	—	—	
2	do.	—	—	—	—	—	+	+	—	—	
1	June 16, 1920	—	—	—	—	—	+	+	—	—	
2	do.	—	—	—	—	—	+	+	—	—	
1	July 1, 1920	—	—	—	—	—	+	+	—	—	
2	do.	—	—	—	—	—	+	+	—	—	

It will be seen from Table 8 that two lambs were selected and given increasing doses of a phenolized culture of *Bacillus ovi-*

septicus subcutaneously until 20 c.c. had been administered in this way. This procedure brought up the agglutinin content of No. 1 from 0 to 100. The agglutinin content of No. 2 stood at 1-100 on first test and was not increased. Intravenous inoculations of bouillon cultures were then started, and this was continued until 15 c.c. were given. The lethal dose of this culture was something less than 10 c.c., and while the animals withstood this dose, and the 15 c.c. dose also, yet they were made ill by both inoculations. Following the 15 c.c. dose, the agglutinin content increased from 1 to 250, but never increased beyond this. It appeared from this experiment that it was possible to immunize sheep against lethal doses of *Bacillus ovisepticus*.

Experiment No. 7

This experiment was arranged to determine whether vaccination with the live organism was better than by the use of a phenolized culture. The whole experiment was checked by means of the agglutination test. Three animals were given 2, 5 and 10 c.c. of a phenolized culture subcutaneously. Three others were given the same amount of a 48-hour bouillon culture subcutaneously. Three were used as controls and remained unvaccinated. Twenty-three days after the administration of the phenolized organism, and 21 days after the administration of the live culture, the vaccinated animals and one control were given 10 c.c. of a virulent organism intravenously. Two of the controls had previously been given 7 c.c. of the same kind of culture. The 10 c.c. and one of the 7 c.c. controls died; the other survived. Of those vaccinated with the phenolized organism, the one receiving 2 c.c. became ill but survived, the other two died. Of those receiving the live organism as vaccine, all survived without showing any signs of illness.

The agglutination test did not reveal the presence of any antibodies in the blood of any of the animals at the beginning of the experiment. Two days after the introduction of 10 c.c. of the phenolized culture, agglutination was positive in 1 to 10. This agglutinating ability was quite transient, as it did not appear again until 14 days after the vaccine had been administered. As measured by the agglutination test, the other two of this group showed no protection, although it will be remembered that No. 1, the one receiving the least amount of vaccine, survived the virulent culture.

On the day following the introduction of the bouillon culture used as vaccine, all three animals showed the presence of agglutinins in the blood. This gradually increased in intensity until the time of the injection of the virulent culture, when the one receiving 2 c.c. showed agglutination at 1 to 25, 5 c.c. showed 1 to 50, and 10 c.c. showed 1 to 100.

It would appear from this experiment that the live organism gives greater immunity as vaccine than does that to which phenol has been added.

TABLE 9.—EXPERIMENT NO. 7.

No.	Date	Agglutination				Remarks
		1:10	1:25	1:50	1:100	
1	July 2, 1920	—	—	—	—	
2	do.	—	—	—	—	
3	do.	—	—	—	—	
4	do.	—	—	—	—	
5	do.	—	—	—	—	
6	do.	—	—	—	—	
7	do.	—	—	—	—	
8	do.	—	—	—	—	
9	do.	—	—	—	—	
1	July 8, 1920	—	—	—	—	2 c. c. vaccine subcutaneously. 5 c. c. vaccine subcutaneously. 10 c. c. vaccine subcutaneously.
2	do.	—	—	—	—	
3	do.	—	—	—	—	
4	do.	—	—	—	—	
5	do.	—	—	—	—	
6	do.	—	—	—	—	
7	do.	—	—	—	—	
8	do.	—	—	—	—	
9	do.	—	—	—	—	
1	July 9, 1920	—	—	—	—	
2	do.	—	—	—	—	
3	do.	—	—	—	—	
1	July 10, 1920	—	—	—	—	2 c. c. 48-hour bouillon culture subcutaneously. 5 c. c. 48-hour bouillon culture subcutaneously. 10 c. c. 48-hour bouillon culture subcutaneously.
2	do.	—	—	—	—	
3	do.	+	—	—	—	
4	do.	—	—	—	—	
5	do.	—	—	—	—	
6	do.	—	—	—	—	
7	do.	—	—	—	—	
8	do.	—	—	—	—	
9	do.	—	—	—	—	
1	July 11, 1920	—	—	—	—	Temperature 105.8 Temperature 106 Temperature 105.2 Temperature 105
2	do.	—	—	—	—	
3	do.	±	—	—	—	
4	do.	+	—	—	—	
5	do.	+	+	—	—	
6	do.	+	+	—	—	
7	do.	—	—	—	—	
8	do.	—	—	—	—	
9	do.	—	—	—	—	
1	July 12, 1920	—	—	—	—	
2	do.	—	—	—	—	
3	do.	—	—	—	—	
4	do.	+	—	—	—	
5	do.	+	±	—	—	
6	do.	+	+	—	—	
7	do.	—	—	—	—	
8	do.	—	—	—	—	
9	do.	—	—	—	—	

TABLE 9.—EXPERIMENT NO. 7—CONTINUED.

No.	Date	Agglutination				Remarks
		1:10	1:25	1:50	1:100	
1	July 13, 1920	—	—	—	—	
2	do.	—	—	—	—	
3	do.	—	—	—	—	
4	do.	+	—	—	—	
5	do.	+	—	—	—	
6	do.	+	±	—	—	
7	do.	—	—	—	—	
8	do.	—	—	—	—	
9	do.	—	—	—	—	
1	July 14, 1920	—	—	—	—	
2	do.	—	—	—	—	
3	do.	—	—	—	—	
4	do.	+	—	—	—	
5	do.	+	—	—	—	
6	do.	+	±	—	—	
7	do.	—	—	—	—	
8	do.	—	—	—	—	
9	do.	—	—	—	—	
1	July 15, 1920	—	—	—	—	
2	do.	—	—	—	—	
3	do.	—	—	—	—	
4	do.	+	—	—	—	
5	do.	+	±	—	—	
6	do.	+	+	—	—	
7	do.	—	—	—	—	
8	do.	—	—	—	—	
9	do.	—	—	—	—	
1	July 16, 1920	—	—	—	—	
2	do.	—	—	—	—	
3	do.	—	—	—	—	
4	do.	±	—	—	—	
5	do.	+	±	—	—	
6	do.	+	+	—	—	
7	do.	—	—	—	—	
8	do.	—	—	—	—	
9	do.	—	—	—	—	
1	July 17, 1920	—	—	—	—	
2	do.	—	—	—	—	
3	do.	—	—	—	—	
4	do.	±	—	—	—	
5	do.	+	+	—	—	
6	do.	+	+	±	—	
7	do.	—	—	—	—	
8	do.	—	—	—	—	
9	do.	—	—	—	—	
1	July 18, 1920	—	—	—	—	
2	do.	—	—	—	—	
3	do.	—	—	—	—	
4	do.	—	—	—	—	
5	do.	+	—	—	—	
6	do.	+	+	±	—	
7	do.	—	—	—	—	
8	do.	—	—	—	—	
9	do.	—	—	—	—	
1	July 19, 1920	—	—	—	—	
2	do.	—	—	—	—	
3	do.	—	—	—	—	
4	do.	+	—	—	—	
5	do.	+	±	—	—	
6	do.	+	+	—	—	
7	do.	—	—	—	—	
8	do.	—	—	—	—	
9	do.	—	—	—	—	

TABLE 9.—EXPERIMENT No. 7—CONTINUED.

No.	Date	Agglutination				Remarks
		1:10	1:25	1:50	1:100	
1	July 20, 1920	—	—	—	—	
2	do.	—	—	—	—	
3	do.	—	—	—	—	
4	do.	+	—	—	—	
5	do.	+	—	—	—	
6	do.	+	+	±	—	
7	do.	—	—	—	—	
8	do.	—	—	—	—	
9	do.	—	—	—	—	
1	July 21, 1920	—	—	—	—	
2	do.	—	—	—	—	
3	do.	—	—	—	—	
4	do.	+	+	—	—	
5	do.	+	+	—	—	
6	do.	+	+	+	+	
7	do.	—	—	—	—	
8	do.	—	—	—	—	
9	do.	—	—	—	—	
1	July 22, 1920	—	—	—	—	
2	do.	—	—	—	—	
3	do.	+	—	—	—	
4	do.	+	+	—	—	
5	do.	+	+	+	—	
6	do.	+	+	+	+	
7	do.	—	—	—	—	
8	do.	—	—	—	—	
9	do.	—	—	—	—	
1	July 23, 1920	—	—	—	—	
2	do.	—	—	—	—	
3	do.	+	—	—	—	
4	do.	+	+	—	—	
5	do.	+	+	±	—	
6	do.	+	+	+	+	
7	do.	—	—	—	—	
8	do.	—	—	—	—	
9	do.	—	—	—	—	
1	July 31, 1920	.....	.....	.....	.....	10 c. c. 48-hour bouillon culture intravenously 10 a. m.
2	do.	.....	.....	.....	.....	do.; 2.45 p. m., very ill.
3	do.	.....	.....	.....	.....	do.; 2.45 p. m., dead.
4	do.	.....	.....	.....	.....	10 c. c. 48-hour bouillon culture intravenously 10 a. m.
5	do.	.....	.....	.....	.....	do.
6	do.	.....	.....	.....	.....	do.
7	do.	.....	.....	.....	.....	do.
8	July 26, 1920	.....	.....	.....	.....	7 c. c. 48-hour bouillon culture intravenously 10 a. m.
9	do.	.....	.....	.....	.....	do.
1	August 1, 1920	.....	.....	.....	.....	Very ill; temperature 106.2.
2	do.	.....	.....	.....	.....	9 a. m., dead.
4	do.	.....	.....	.....	.....	Normal; eating; temperature 104.6.
5	do.	.....	.....	.....	.....	Normal; eating; temperature 104.8.
6	do.	.....	.....	.....	.....	Normal; eating; temperature 105.
7	do.	.....	.....	.....	.....	Very ill; unable to stand; temperature 106.
8	July 27, 1920	.....	.....	.....	.....	Normal; eating; temperature 104.6.
9	do.	.....	.....	.....	.....	Very ill; not eating; temperature 106.2.
1	August 2, 1920	.....	.....	.....	.....	Looks better; eating; temperature 105.
4	do.	.....	.....	.....	.....	Normal; temperature 104.8.
5	do.	.....	.....	.....	.....	Normal; temperature 104.8.
6	do.	.....	.....	.....	.....	Normal; temperature 104.6.
7	do.	.....	.....	.....	.....	8 a. m., dead.
8	July 28, 1920	.....	.....	.....	.....	Normal; temperature 104.8.
9	do.	.....	.....	.....	.....	Down; unable to rise.

TABLE 9.—EXPERIMENT NO. 7—CONTINUED.

No.	Date	Agglutination				Remarks
		1:10	1:25	1:50	1:100	
1	August 3, 1920	.....	.....	.....	.....	Normal.
4	do.	.....	.....	.....	.....	do.
5	do.	.....	.....	.....	.....	do.
6	do.	.....	.....	.....	.....	do.
8	July 29, 1920	.....	.....	.....	.....	do.
9	do.	.....	.....	.....	.....	Dead.
1	Sep. 14, 1920	—	—	—	—	
4	do.	+	+	+	+	
5	do.	+	±	+	+	
6	do.	+	+	+	+	
8	do.	—	—	—	—	

Experiment No. 8

This experiment is practically a duplication of No. 7, with a view to determining whether the live organism is of greater value as a vaccine than the dead.

TABLE 10.—EXPERIMENT NO. 8.

No.	Date	Agglutination				Remarks
		1:10	1:25	1:50	1:100	
1	Jan. 31, 1920	—	—	—	—	
2	do.	—	—	—	—	
3	do.	—	—	—	—	
4	do.	—	—	—	—	
5	do.	—	—	—	—	
6	do.	—	—	—	—	
7	do.	—	—	—	—	
8	do.	+	—	—	—	
9	do.	±	—	—	—	
1	Feb. 7, 1921	—	—	—	—	
2	do.	—	—	—	—	
3	do.	—	—	—	—	
4	do.	—	—	—	—	
5	do.	—	—	—	—	
6	do.	—	—	—	—	
7	do.	—	—	—	—	
8	do.	+	—	—	—	
9	do.	—	—	—	—	
1	Feb. 14, 1921	.....	.....	.....	.....	2 c. c. 48-hour bouillon culture subcutaneously.
2	do.	.....	.....	.....	.....	5 c. c. 48-hour bouillon culture subcutaneously.
3	do.	.....	.....	.....	.....	10 c. c. 48-hour bouillon culture subcutaneously.
4	Feb. 15, 1921	.....	.....	.....	.....	2 c. c. vaccine subcutaneously.
5	do.	.....	.....	.....	.....	5 c. c. vaccine subcutaneously.
6	do.	.....	.....	.....	.....	10 c. c. vaccine subcutaneously.
1	Feb. 16, 1921	+	—	—	—	
2	do.	+	—	—	—	
3	do.	+	—	—	—	
4	do.	—	—	—	—	
5	do.	+	—	—	—	
6	do.	—	—	—	—	
7	do.	—	—	—	—	
8	do.	+	—	—	—	
9	do.	—	—	—	—	

TABLE 10.—EXPERIMENT NO. 8—CONTINUED.

No.	Date	Agglutination				Remarks
		1:10	1:25	1:50	1:100	
1	Feb. 17, 1921	—	—	—	—	
2	do.	+	—	—	—	
3	do.	+	—	—	—	
4	do.	—	—	—	—	
5	do.	+	—	—	—	
6	do.	—	—	—	—	
7	do.	—	—	—	—	
8	do.	+	—	—	—	
9	do.	—	—	—	—	
1	Feb. 18, 1921	—	—	—	—	
2	do.	+	—	—	—	
3	do.	+	—	—	—	
4	do.	—	—	—	—	
5	do.	+	—	—	—	
6	do.	—	—	—	—	
7	do.	—	—	—	—	
8	do.	+	—	—	—	
9	do.	—	—	—	—	
1	Feb. 19, 1921	—	—	—	—	
2	do.	+	—	—	—	
3	do.	+	—	—	—	
4	do.	—	—	—	—	
5	do.	+	—	—	—	
6	do.	—	—	—	—	
7	do.	—	—	—	—	
8	do.	+	—	—	—	
9	do.	—	—	—	—	
1	Feb. 21, 1921	—	—	—	—	
2	do.	+	—	—	—	
3	do.	+	—	—	—	
4	do.	—	—	—	—	
5	do.	+	—	—	—	
6	do.	—	—	—	—	
7	do.	—	—	—	—	
8	do.	+	—	—	—	
9	do.	—	—	—	—	
1	Feb. 22, 1921	±	—	—	—	
2	do.	+	+	—	—	
3	do.	+	—	—	—	
4	do.	—	—	—	—	
5	do.	+	—	—	—	
6	do.	—	—	—	—	
7	do.	—	—	—	—	
8	do.	+	—	—	—	
9	do.	—	—	—	—	
1	Feb. 23, 1921	—	—	—	—	
2	do.	+	—	—	—	
3	do.	+	—	—	—	
4	do.	—	—	—	—	
5	do.	+	—	—	—	
6	do.	—	—	—	—	
7	do.	—	—	—	—	
8	do.	—	—	—	—	
9	do.	—	—	—	—	
1	Feb. 24, 1921	±	—	—	—	
2	do.	+	+	—	—	
3	do.	+	—	—	—	
4	do.	+	—	—	—	
5	do.	+	—	—	—	
6	do.	+	—	—	—	
7	do.	—	—	—	—	
8	do.	+	—	—	—	
9	do.	—	—	—	—	

TABLE 10.—EXPERIMENT NO. 8—CONTINUED.

No.	Date	Agglutination				Remarks
		1:10	1:25	1:50	1:100	
1	Feb. 25, 1921	±	—	—	—	
2	do.	+	—	—	—	
3	do.	+	—	—	—	
4	do.	—	—	—	—	
5	do.	+	—	—	—	
6	do.	—	—	—	—	
7	do.	—	—	—	—	
8	do.	—	—	—	—	
9	do.	—	—	—	—	
1	Feb. 26, 1921	—	—	—	—	
2	do.	+	—	—	—	
3	do.	+	—	—	—	
4	do.	+	—	—	—	
5	do.	+	—	—	—	
6	do.	+	—	—	—	
7	do.	—	—	—	—	
8	do.	+	—	—	—	
9	do.	—	—	—	—	
1	Feb. 28, 1921	—	—	—	—	
2	do.	+	+	—	—	
3	do.	+	—	—	—	
4	do.	+	—	—	—	
5	do.	+	—	—	—	
6	do.	+	—	—	—	
7	do.	—	—	—	—	
8	do.	+	—	—	—	
9	do.	—	—	—	—	
1	March 1, 1921	—	—	—	—	
2	do.	+	+	—	—	
3	do.	+	—	—	—	
4	do.	+	—	—	—	
5	do.	+	—	—	—	
6	do.	—	—	—	—	
7	do.	—	—	—	—	
8	do.	+	—	—	—	
9	do.	—	—	—	—	
1	March 2, 1921	+	—	—	—	
2	do.	+	+	—	—	
3	do.	+	+	—	—	
4	do.	+	—	—	—	
5	do.	+	—	—	—	
6	do.	+	—	—	—	
7	do.	+	—	—	—	
8	do.	+	—	—	—	
9	do.	—	—	—	—	
1	March 3, 1921	+	±	—	—	
2	do.	+	+	+	—	
3	do.	+	+	+	—	
4	do.	+	—	—	—	
5	do.	+	+	—	—	
6	do.	+	+	—	—	
7	do.	—	—	—	—	
8	do.	+	—	—	—	
9	do.	—	—	—	—	
1	March 4, 1921	+	+	—	—	
2	do.	+	+	+	—	
3	do.	+	+	+	—	
4	do.	+	—	—	—	
5	do.	+	+	—	—	
6	do.	+	+	—	—	
7	do.	—	—	—	—	
8	do.	+	—	—	—	
9	do.	—	—	—	—	

TABLE 10.—EXPERIMENT No. 8—CONTINUED.

No.	Date	Agglutination				Remarks
		1:10	1:25	1:50	1:100	
1	March 5, 1921	+	+	—	—	
2	do.	+	+	+	+	
3	do.	+	+	+	—	
4	do.	+	—	—	—	
5	do.	+	+	—	—	
6	do.	+	+	—	—	
7	do.	—	—	—	—	
8	do.	+	—	—	—	
9	do.	—	—	—	—	
1	March 7, 1921	+	+	—	—	
2	do.	+	+	+	+	
3	do.	+	+	+	±	
4	do.	+	—	—	±	
5	do.	+	+	—	—	
6	do.	+	+	—	—	
7	do.	—	—	—	—	
8	do.	+	—	—	—	
9	do.	—	—	—	—	
1	March 8, 1921	+	+	—	—	
2	do.	+	+	+	+	
3	do.	+	+	+	±	
4	do.	+	—	—	—	
5	do.	+	+	—	—	
6	do.	+	+	—	—	
7	do.	—	—	—	—	
8	do.	+	—	—	—	
9	do.	—	—	—	—	
1	March 9, 1921	+	+	—	—	
2	do.	+	+	+	+	
3	do.	+	+	+	—	
4	do.	+	—	—	—	
5	do.	+	+	—	—	
6	do.	+	+	±	—	
7	do.	+	—	—	—	
8	do.	+	—	—	—	
9	do.	—	—	—	—	
1	March 10, 1921	+	+	—	—	
2	do.	+	+	+	+	
3	do.	+	+	+	—	
4	do.	+	—	—	—	
5	do.	+	+	—	—	
6	do.	+	+	+	—	
7	do.	+	—	—	—	
8	do.	+	—	—	—	
9	do.	—	—	—	—	
1	March 16, 1921	.....	.....	.....	.....	2.40 p. m., 20 c. c. 48-hour bouillon culture intravenously.
2	do.	.....	.....	.....	.....	do.
3	do.	.....	.....	.....	.....	do.
4	do.	.....	.....	.....	.....	do.
5	do.	.....	.....	.....	.....	do.
6	do.	.....	.....	.....	.....	do.
7	do.	.....	.....	.....	.....	2.40 p. m., 10 c. c. 48-hour bouillon culture intravenously.
8	do.	.....	.....	.....	.....	2.40 p. m., 15 c. c. 48-hour bouillon culture intravenously.
9	do.	.....	.....	.....	.....	2.40 p. m., 20 c. c. 48-hour bouillon culture intravenously

TABLE 10.—EXPERIMENT NO. 8—CONTINUED.

No.	Date	Agglutination				Remarks
		1:10	1:25	1:50	1:100	
1	March 17, 1921	.....	.....	.....	.....	8.15 a. m., eating a little.
2	do.	.....	.....	.....	.....	Dull, respiration rapid.
3	do.	.....	.....	.....	.....	Dull, lame in hind leg.
4	do.	.....	.....	.....	.....	Dead.
5	do.	.....	.....	.....	.....	Eating a little; temperature 105.
6	do.	.....	.....	.....	.....	Eating a little; temperature 104.2.
7	do.	.....	.....	.....	.....	Dead.
8	do.	.....	.....	.....	.....	Respiration rapid; not eating; temperature 105.2.
9	do.	.....	.....	.....	.....	Down, comatose, labored respiration; temperature 105.2.
1	March 18, 1921	.....	.....	.....	.....	9.00 a. m., stiff, quite lame in front; eating some; lies most of time.
2	do.	.....	.....	.....	.....	Eating little; stiff, but seems to feel well.
3	do.	.....	.....	.....	.....	Very stiff; discharge from nose; lies most of time.
5	do.	.....	.....	.....	.....	Very lame in front; rises with difficulty. Epistaxis.
6	do.	.....	.....	.....	.....	Eating; looks well.
8	do.	.....	.....	.....	.....	Not eating; head down; moves with difficulty.
1	March 19, 1921	.....	.....	.....	.....	Very dull; down; can not rise.
2	do.	.....	.....	.....	.....	Eating; feels well.
3	do.	.....	.....	.....	.....	Eating a little; feels better.
5	do.	.....	.....	.....	.....	Down; unable to rise; not eating.
6	do.	.....	.....	.....	.....	Feeling well.
8	do.	.....	.....	.....	.....	Down; rises with difficulty; not eating.
1	.....	.....	.....	.....	.....	Gradually got worse and died April 5, 1921.
2	.....	.....	.....	.....	.....	Continued normal.
3	.....	.....	.....	.....	.....	Gradually improved and became normal about April 8, 1921.
5	.....	.....	.....	.....	.....	Gradually grew worse and died May 9, 1921.
6	.....	.....	.....	.....	.....	Continued normal.
8	.....	.....	.....	.....	.....	Remained down for a month, but finally recovered, although one knee remained swollen.

It was found necessary to use a larger dose of the virulent culture than in the previous experiment; consequently 20 c.c. was established. The three controls were given 10, 15 and 20 c.c. respectively. Of these, the one receiving 10 and 20 died, the one receiving 15 became very ill and remained down for over a month. He finally survived, however, although one knee remained swollen for a considerable period of time.

Of those receiving the phenolized culture, the 2 c.c. animal died on the day after injection; the 5 c.c. animal sickened and died some six weeks after the inoculation; the 10 c.c. remained healthy.

Of those receiving the live organism as vaccine, the one receiving 2 c.c. sickened and died some three weeks later, the one receiving 5 c.c. continued normal, and the one receiving 10 c.c. sickened but recovered after being ill for about three weeks.

On the day following the administration of the culture as vaccine all three of the animals showed agglutination at 1:10. The one that received 2 c.c. then showed no agglutination for four days, when after several doubtful reactions it became positive in 1:10 and finally in 1:25, where it remained until the injection of the lethal dose. The one receiving 5 c.c. stood at 1:10 for several days, then at 1:25 for the first time on the seventh day, at 1:50 on the fifteenth day, 1:100 on the seventeenth day, where it remained until injected. The one receiving 10 c.c. showed at 1:10 on the next day, 1:25 on the fifteenth day, and 1:50 on the seventeenth day, where it remained except for a couple of doubtful reactions until the injection. It is interesting that the animal receiving 5 c.c. in this series showed the highest agglutination and the least disturbance when injected.

In the series receiving the phenolized culture the one getting 2 c.c. showed agglutination constantly at 1:10, after the eleventh day, but never increased beyond this. The 5 c.c. lamb showed agglutination at 1:10 after injection until the sixteenth day, when it rose to 1:25, where it remained until the injection. The 10 c.c. animal showed agglutination at 1:10 for the first time on the ninth day, raised to 1:25 on the sixteenth day, where, with the exception of a doubtful reaction, it remained until the injection.

It ought to be added that the culture used here as vaccine had phenol added to it only 24 hours previous to the time it was used. This, as shown by a later experiment, is not a sufficient time to destroy the organism, and consequently it is probable that this experiment does not show the true difference between a dead and a live organism as it was intended, but shows only the difference between a live organism used a vaccine and one in which a part of the organisms have been destroyed by phenol.

DISCUSSION

It is very evident that our work with rabbits was so limited as to be of little value on which to form conclusions, but the indication was that the vaccines as we used them only rendered animals more susceptible to the organism. The use of a live

organism in rabbits would be very difficult, owing to the extremely small lethal dose for that animal. This has not been tried.

In sheep, while it is probable that the lethal dose would have to be determined for every strain from which vaccine is to be prepared, yet it is our experience that it takes a large amount of a *Bacillus ovisepticus* culture to destroy sheep when administered subcutaneously. We therefore feel that within reasonable limits, such as ought to prevail in every laboratory, the administration of the live *B. ovisepticus* as a vaccine should not be fraught with any considerable danger. We are aware that Miessner and Schern destroyed sheep with just a few loopfuls of the organism, but after working with a large number of strains we have not been able to find one that had any such virulence.

While our work needs confirmation, and there are many problems yet to be settled, we are of the opinion that the present indication is toward the use of a live organism as vaccine, and the abandonment of the dead organism, whether it be killed by heat or antiseptics.

SUMMARY

It appears from the experiment here shown that the strains of *Bacillus ovisepticus* used by us gave little protection, if any, in either rabbits or sheep when the organisms were destroyed by heat.

It is further indicated that destruction by phenol destroys a large proportion of their immunizing power.

It does seem that the organism when used in considerable amounts and used alive gives some protection to sheep against lethal doses following and also as measured by the agglutination test.

LITERATURE CITED

1. VAN ES and MARTIN. Nebr. Expt. Sta. Research Buls. 17 and 18.
2. PASTEUR. Compt. Rend. Acad. Sci., vol. 90.
3. KOLLE and WASSERMANN'S Handbuch, Bd. 6, p. 37.
4. HADLEY, P. B. R. I. Expt. Sta. Buls. 144, 146, 150, 159, 179.
5. LIGNIERES. Bul. et Mem., Soc. Cent. Méd. Vét., vol. 16, p. 761.
6. MIESSNER and SCHERN. Arch. fur Tierheilk., 36, p. 208.

TENDENCY OF ORGANISMS OF THE PASTEURELLA GROUP TO LOCALIZE

By CHARLES MURRAY and S. H. McNUTT

*Department of Veterinary Investigation, Iowa State College,
Ames, Iowa*

THE frequent observation of the occurrence of arthritis in fowls autopsied, the history of whose cases suggested fowl cholera of an acute or subacute character in the flock at a previous time, led us to make careful study of all such birds when received at the laboratory. The records now include a great many such, and a study of the literature seems to justify this article.

Hutyra and Marek state that "bipolar bacilli manifest a particular affinity towards certain organs and therefore pathological changes develop in the less acute cases only in certain organs. In such predisposed organs either acute or chronic inflammations may be present. The serous membranes of the joints and tendons, and probably the liver, are the favored organs. Sometimes one or more joints of the wings or feet swell, later the swelling bursts, whereupon a caseous, purulent mass containing bacilli is discharged from the joints. The arthritis interferes to a great extent with the movements of the already weakened birds."

Frohner and Zwick record the occurrence of many cases of swollen articulations filled with purulent, caseous or calcareous material. Lignières makes mention of the common occurrence of the condition. Willach and Sticker observed in the intestines, lung and liver of fowls caseous nodules containing bipolar organisms. They state that in this form of the disease there are few if any organisms in the blood stream. Our own observations of many cases are the same.

Chickens usually less than one year old suddenly become lame with considerable swelling of the articulations of the affected leg or legs. Those thus affected show progressive sickness, usually terminating in from a few to fourteen days in death. A few recoveries were reported in one flock. In very young chickens the disease processes extended most rapidly. In older birds there is variation, but the extension of the disease is always slower. In from one to three days lameness becomes such

as to make it impossible for the birds to walk. Atrophy of the leg muscles ensues, and mechanical injuries, resulting in necrosis of the skin of legs and breast, occur. The legs often assume unnatural positions, being greatly extended forward or backward, tensed and stiff, and difficult to flex when force is applied. The birds are unable or unwilling to attempt to move, and the picture presented in this later stage is one of paralysis and the condition is usually so diagnosed by the owner. Swellings of the joints are usually noted at the time lameness is apparent, and are more pronounced in the early stages, subsiding as the disease progresses. The swellings are usually found in the region of the tendon above the tibio-tarsal articulation, occasionally in other joints.

Aside from the changes noted on external examination, the lesions found on autopsy consist of abscess formation usually close to or in one or more of the joints of legs or feet. In one fowl in addition to abscesses in the joints there was one at the anterior portion of the gizzard. Most of the abscess formations around the joints are peculiar in that they are not well walled off. They show little necrosis of the surrounding tissues; the contents are hard and plug-like and of a yellowish, chicken-fat appearance. When the surrounding tissues are incised the contents are easily expressed entire. A few abscesses contain a thin, watery, flocculent, dirty fluid with evident necrosis of the tissues. If the articulations themselves are affected their surfaces are somewhat eroded and the fluid content is yellowish and opaque.

Bacteriological examination by direct smears is usually negative as regards the finding of characteristic bipolar organisms, but planting in every case gave a growth of a pure culture of *Pasteurella aviseptica*, as proven by subsequent cultural tests and animal inoculation.

In two other species of animals besides the fowl we have observed localization of infection by the bipolar organism, namely, in the horse and the sheep. A four-year-old mare was being used for the production of antiserum against *Pasteurella bovis-septica*. Following each of the injections of large quantities of culture of the organism, lameness and swelling of the left stifle joint occurred. After two or more months' attempted immunization of the animal a large injection of the organism killed her, and upon autopsy the affected joint was found filled with a

gelatinous fluid from which bipolar organisms highly pathogenic for rabbits were recovered.

A 24-hour-old lamb from a flock of sheep in which a number had died from hemorrhagic septicemia showed marked symptoms of the disease. It was treated with hemorrhagic septicemia anti-serum and recovered. During the summer after the lamb had grown to a size of 40 or 50 pounds it was found dead in the field. At autopsy the only lesion found was a growth on the right auriculo-ventricular valve the size of a hazelnut. Direct smears from the contents of this nodule showed many characteristic bipolar organisms which were recovered in culture and which proved highly pathogenic for rabbits.

BIBLIOGRAPHY

- FROHNER and ZWICK. Pathologie und Therapie der Haustiere.
HUTYRA and MAREK. Pathology and Therapeutics of the Domestic Animals.

DR. BALDWIN INJURED

With his sedan automobile practically smashed beyond repair and himself considerably bruised about the body and his left leg broken below the knee, Dr. A. F. Baldwin of Montana narrowly escaped with his life when a Northern Pacific passenger train crashed into his machine.

Doctor Baldwin declares he did not hear any warning whistle from the approaching train and believes the engineer did not see him. It is related that after the train passed a passenger in one of the coaches noticed the wreckage of the automobile and called the conductor's attention to the matter, the latter signalling for a stop, when the doctor was picked up and brought immediately into the city and taken at once to the hospital where medical attention was given.

DR. DALRYMPLE GIVEN FORD SEDAN

As a token of the esteem and affection in which he is held by members of the faculty, the experiment station and the extension staffs, Dr. W. H. Dalrymple was presented with a Ford sedan as a Christmas gift by these coworkers. The car was fully equipped in every detail, even to the 1922 license plate. The fund for this purchase was raised among the University people through the efforts of Prof. E. L. Jordan of the College of Agriculture and Mr. C. E. Woolman of the extension division.

THE RELATIVE VALUE OF TREATMENT AND PROPHYLAXIS IN THE CONTROL OF PARASITIC DISEASES ¹

By MAURICE C. HALL

*Senior Zoologist, U. S. Bureau of Animal Industry, Washington,
D. C.*

SO FAR as the practicing veterinarian is concerned, all the training of the veterinary course looks forward to diagnosis, treatment and prophylaxis. The veterinarian must recognize diseases for what they are, must be able to cure them if curable, and must know the measures for limiting their spread and recurrence. This paper is a consideration of the comparative values of treatment and prophylaxis in connection with parasitic diseases.

Some of the parasitic diseases are readily amenable to treatments now known to us, and others are not amenable to any treatment known at present. Some of the parasitic diseases are easily prevented on the basis of our present knowledge, and others are not easy to prevent because our knowledge of the life history of the parasite is inadequate or the measures indicated on the basis of a known life history are not feasible. Where we have a satisfactory treatment for the removal of a given parasite which we can not control by prophylactic measures, treatment becomes a more important measure than prophylaxis. Treatment is essentially the field of the veterinarian. Where we have simple prophylactic measures for the control of parasites not at present amenable to any known medication, prophylaxis becomes a more important measure than treatment. The carrying out of prophylactic measures is essentially the field of the stockman and farmer; the function of the veterinarian as regards prophylaxis is mostly advisory, though sometimes regulatory. Where we have satisfactory treatments and prophylactic measures for a given parasite, both treatment and prophylaxis are important, one supplementing the other, and both should be used. The sick animal needs treatment first and prophylaxis second; the well animal needs prophylaxis that treatment may not be needed. Where we have neither satisfac-

¹ Presented at the fifty-eighth annual meeting of the American Veterinary Medical Association, Denver, Colo., September 5-9, 1921.

tory treatments nor prophylactic measures, we are in rather a bad way from the standpoint of the practitioner, and of the stockman and farmer, and can only console ourselves with the reflection that the things we don't know are the ones which furnish occupation to the investigator.

PRINCIPLES OF TREATMENT AND PROPHYLAXIS

Certain principles may be laid down with reference to the value of treatment and of prophylaxis in the case of any given parasite. These principles may not be of universal application or may be of variable application. Things which are feasible in the city may not be feasible in the country, or vice versa. What a European veterinarian would regard as feasible might appear entirely impracticable to an American, and the converse might also be true. With this limitation in mind, however, the principles in regard to treatment may be stated as follows:

Only those parasites which are accessible to known medicinal medication or surgical measures may be controlled by treatment, and the treatment must be effective and practical, not too elaborate or expensive.

The principles in regard to prophylaxis may be stated as follows: We must know, or be able to surmise rather definitely, the life history of the parasite, and where the parasite is ingested by the host we must be able to control the food habits of the host, without a resultant loss, financial or otherwise, more serious than that arising from the presence of the parasite.

DISCUSSION OF PRINCIPLES OF TREATMENT

Before attempting to apply these principles to specific worm infestations, they may be examined in detail, beginning with those in regard to treatment. Exactly what is meant by parasites accessible to medication is a thing which requires some consideration and careful statement. What is apparently inaccessible in the light of yesterday's knowledge may be evidently accessible today; what is apparently inaccessible today may be accessible tomorrow.

There are certain anatomical regions which appear on first sight to be accessible to anthelmintics, and experience shows that these regions are as accessible as they appear to be. Thus the lumen of the entire digestive tract of the horse is now known to be accessible to anthelmintics, and excellent results may be

obtained against practically any worm parasite of the horse which occurs in the lumen of the digestive tract, by the use of two drugs, carbon bisulphide and oil of chenopodium, by mouth.

The lumen of the digestive tract of the dog is also accessible to anthelmintic medication, though the entrance of a given dose of a drug into the cecum can not be guaranteed. In the case of the horse the fact that the cecum has two openings insures the entrance of a drug into this organ if the drug passes the ileo-cecal valve. In the case of the dog a drug may pass the ileo-colic valve and proceed down the colon without entering the cecum. This conclusion is based on the anatomical structure, the small size of the cecum, and the fact that in the great majority of cases a given anthelmintic will not remove whipworms, but many of these anthelmintics will occasionally remove some or all of the whipworms present. Since repeated doses of suitable anthelmintics will in a reasonable time enter the cecum of the dog and remove the worms present there, we may consider the cecum of this animal as accessible to medication. In the case of swine, experiments show that the lumen of the stomach and small intestine is accessible to anthelmintic medication.

At present we have little evidence in regard to the accessibility to anthelmintics of the cecum and large intestine of swine, but there is little reason to suppose that these will prove inaccessible. In ruminants the lumen of the stomachs is accessible to anthelmintic medication, and the work of Lewis and Gubernet at the Oklahoma Experiment Station indicates that the small intestine will prove likewise accessible. As yet we have little knowledge as regards anthelmintic removal of worms from the cecum and colon of these animals. Brumpt has used rectal injections of thymol against whipworms in the cecum of sheep, but the administration of this treatment according to the technique he gives would not appear practical or feasible to the American veterinarian and would hardly appear to be warranted on a balance of the time and cost of treatment against the benefits received. However, we have every reason to suppose that satisfactory treatments for worms in the large intestine of swine will be developed.

Outside of the lumen of the intestine, parasites appear to be accessible to anthelmintic medication in the case of certain blood-sucking parasites in the bile ducts. Thus male fern and some of its components have been found effective against the common

liver fluke of sheep. That this efficacy is apparently associated with the blood-sucking habit is indicated by the fact that the small lancet fluke of sheep, which is not a blood-sucking form, is not affected by the same treatment, in spite of the fact that it also lives in the bile ducts, often in association with the common liver fluke.

Some worms in the blood vessels are amenable to anthelmintic medication. The outstanding examples of this at present are the human blood flukes, which have proven amenable to intravenous injections of tartar emetic. The nematodes in the blood stream do not at present appear to be equally amenable, but it appears as reasonable to suppose that some suitable drug will be found as to suppose that such a drug will not be found.

Locations which at present appear to be inaccessible to medication include the mucosa and submucosa of the digestive tract, most connective tissue except the subcutaneous, which can be reached by hypodermic medication, hepatic and pulmonary cysts, the kidneys and the body musculature. Theoretically, effective drugs may be found and put in effective contact with parasites in some of these locations by way of the blood stream, but such treatments have not yet been devised.

Among the locations which are accessible to treatment, but in which treatment is not usually satisfactory or effective, the air spaces of the lungs deserve mention. There are numerous treatments for lungworms and it is not difficult to inject drugs intratracheally in such animals as sheep, cattle and horses. However, experience does not indicate that these injections usually affect the worms in the lungs very seriously, whereas the effect on the host animal is sometimes injurious. Experiments by Gilruth in New Zealand have indicated that better results were obtained by nursing treatment without medication directed against the lungworms than were obtained by various kinds of medication. Some time ago Herms and Freeborn at the California Experiment Station recommended the injection of chloroform into the nostrils of animals suffering from lungworms, but the investigators in question noted that the worms were not killed by the treatment. They claimed good clinical results, but Fitch has recently stated that he has tested this treatment and not found it effective. The lungs are likewise accessible to fumigants, and many of these, such as sulphur dioxide, have been recommended for use against lungworms, but the

results do not appear to be very satisfactory and the treatment appears to be even more dangerous as a rule than intratracheal injections. At the present time the lungs must be regarded as accessible to medication, but it appears that suitable medication, capable of killing the worms without injury to the host animal, remains to be developed.

As regards the principle that treatment must not be too elaborate or expensive, it is sufficient to say that drugs used must not be too expensive, apparatus too elaborate, or technique too elaborate, cumbersome or tedious.

DISCUSSION OF PRINCIPLES OF PROPHYLAXIS

In the same way we may examine the principles set forth in regard to prophylaxis. As stated, we must first know or accurately surmise the life history of a parasite before prophylaxis of a rational sort is possible. There are many life histories we do not know. Among these are the life histories of the anoplocephaline tapeworms of horses, sheep and cattle. Until we know these life histories, prophylaxis is mere surmise for the most part, and in covering the apparent possibilities we are apt to waste energy on useless measures. There are many life histories which we surmise at present, but surmise is often dangerous. Thus we assume that in a general way all the trichostrongyles in the stomach and intestines have much the same life history, but investigations may prove that we have assumed too much and that we are in error. Recently Rodenwalt and Roeckemann have stated that the biology of the helminths is a realm of surprises, "Die Biologie der Helminthen ist ein Gebiet der Ueberraschungen," and the recent developments in the study of the life history of ascarids, the broad fish tapeworm, the human pinworm and other worms afford striking evidence of this fact. We must be alert to reject the absurd and yet keep an open mind as to the possibility of the improbable and seemingly fantastic.

Where we do know the life history of a parasite, the indicated prophylaxis all too frequently falls in the category of measures involving more loss or having more objections than the existence of the parasite itself. Thus we may say that the indicated prophylaxis to protect cats from becoming infested with the common cat tapeworm, *Taenia taeniaeformis* (*T. crassicollis*), is to prevent cats from catching and eating rats and mice. But the

catching of rats and mice, which usually involves the eating of these rodents, is the sole reason for maintaining cats in many cases. To prevent ducks and geese from becoming infested with certain tapeworms it is only necessary to prevent their eating the water fleas and other small crustaceans in streams and ponds, but these crustaceans are of common occurrence in the customary food supply of these birds, and in default of serious consequences following the presence of these worms most owners would prefer to allow the birds to continue in their usual feeding habits and acquire some tapeworms. Which case brings up the important idea of the control of food supply as a factor in prophylaxis for the control of parasitic diseases.

In the case of man, the increase in knowledge of disease has gone hand in hand with sanitation. Sanitation has been dovetailed with certain habits of the human animal. Man is the only animal that cooks his food and distinctly separates his culinary arrangements and his sanitary arrangements. This sterilization by cooking and the separation of all that appertains to metabolic intake from all that appertains to metabolic waste are fundamental. We can approximate these conditions for some of our domesticated animals. Under favorable conditions we can feed our dogs and cats on cooked meats in clean receptacles and educate them along lines of cleanliness in disposing of metabolic wastes. We can raise pigs under conditions approximating cleanliness. But where herbivores, such as the horse, cow and sheep, must be run on pasture to utilize the vegetation which makes up the bulk of their feed, the situation is different. These animals feed on pastures and pass their manure on these pastures. In other words, they continually soil their table with feces and with the fecal content of parasitic worm eggs and larvæ. This is unavoidable for the most part.

Numerous measures have been devised for diminishing the injury resulting from this habit. Pasture and stock rotation are two of the more important of these measures. In simple pasture rotation animals are moved from one pasture to another from time to time, the unused pasture being left fallow as a rule. Its applicability is limited by the fact that it calls for more pasture than is oftentimes available to make it effective in preventing worm infestation. Worm eggs often develop to the infective stage, or their embryos hatch and develop to the infective stage, in the course of a couple of weeks. Theoretically

stock should be moved to fresh pasture, or pasture which has not been used by the same kind of stock for at least a year, every two weeks during the season when worms develop this rapidly, to prevent infestation with such worms. In actual practice this requires more grazing area than is usually available. To be sure, the period of rotation may be lengthened under these conditions and benefits still secured from the rotation, but the benefits diminish as the period lengthens. A second objection is that such a system of pasture rotation calls for a relatively large amount of fencing, and fencing is expensive. A third objection is that a system of pasture rotation calls for considerable attention and thought on the part of the farmer and stockman. It is not a thing that can be attended to once or repeated as a simple routine, but is a thing that requires planning and attention at rather frequent intervals. Usually the farmer and stockman is too busy with other matters and often too tired physically when the day's work is done to make or follow up plans of this sort.

The time limitations of such a rotation plan are rather rigid. Parasite eggs and infective larvæ are quite resistant, and even with the lapse of a year a pasture can not be regarded as entirely safe or free from worms. Its status has improved, but the total destruction of the worm infection can not be assumed. And since it seldom happens that one can follow up the theoretical ideal of a movement to fresh pastures every two weeks throughout warm weather and a return to old pastures at the end of a year, in actual practice stock must be moved less frequently and returned to old pastures before the end of a year, and often much before the end of a year. The more slowly they are rotated and the sooner and oftener they return to old pastures, the less effective this mode of control becomes.

Such a system of pasture rotation may be modified by plowing up and planting pastures after use, and this will bury and destroy numbers of eggs and larvæ, improving the value of the system as a method of parasite control. But it is not always feasible or advisable to plow under a pasture for this purpose, and to the extent that it is not feasible or advisable this method of control must be regarded as inapplicable and of limited practical value.

Stock rotation is essentially only a modification of pasture rotation, but it may be a highly important modification and it

appears to be a more useful and valuable procedure. In general, ruminants, horses and swine may follow one another with little danger from one another's parasites, as these three groups of animals have few parasites in common. In addition there is probably a cleansing of the pastures, so far as parasites are concerned, as the result of such a rotation system. While we have yet too little evidence of a definite sort on this subject, it is quite probable that the parasites taken up by unsuitable hosts are frequently destroyed in such hosts, thereby definitely diminishing the amount of infestation present on the pasture. Such a system of stock rotation lessens the need of plowing up pastures and so makes it possible to conserve permanent pasture without the attendant danger from the permanent pasture carrying only one kind of stock. It also makes it possible to utilize these pastures up to their full capacity for feed without the loss from pastures lying fallow and unused. It does not require as much land as a system of simple pasture rotation, and fewer fields mean less fencing. It does, however, have the limitation that it can not always be applied, since many farms do not carry two or three kinds of livestock and seldom carry them in anything like the same amount as regards pasture requirements.

Although pasture and stock rotation are extensively recommended and deserve to be used wherever feasible and applicable, the limitations of these systems are fairly evident. Eradication of parasitic worms by such systems would evidently be a long and tedious task. We can obtain some light on the probable value of these systems by a consideration of the history of the warfare on the Texas fever tick. For many years pasture rotation methods for the slow destruction of the fever tick by starvation were given the same emphasis as were dipping, hand-picking and other measures aimed at the immediate destruction of the tick. As time went by and theory was given the acid test of practice, the emphasis changed. The final slogan of the tick campaign became "Dip that tick!" not "Starve that tick!" In other words, direct action on the field of battle won out against the idea of the food blockade. It is a principle of warfare that an active offensive is often the best line of defense, and this principle appears most promising in the warfare against worms.

At the experiment station of the Zoological Division of the Bureau of Animal Industry at Vienna, Virginia, the routine

use of the 1 per cent solution of copper sulphate every month throughout the year against stomach worms in sheep has proved an astonishingly satisfactory control measure. Pasture rotation alone allows the worms to remain and make provision for the perpetuation of the species with only the limitation that such rotation sets upon the welfare of the eggs and larvæ on the pasture. Treatment attacks the enemy in his own territory and at his base of supplies. It destroys the worms in large numbers, and as soon as the infested animal is again ready to withstand treatment it attacks again. So far as we can judge in this case, and it applies to similar nematode infestations in all herbivores, what has proven true in the case of the tick will probably prove true in the case of the nematode worms amenable to treatment in the animals that feed on pasture. We shall probably come in time to the slogan "Kill the worms!" rather than "Starve the worms!" It is not intended to decri pasture rotation. Pasture and stock rotation should be used wherever feasible, but as a supplement to treatment, wherever treatment is possible, not as a substitute for treatment.

Owing to the fact, already noted, that the herbivores soil their table with their feces, treatment is apparently always necessary whenever worm infestation exists and treatment is known. It is the primarily essential measure. If prophylaxis is possible, prophylactic measures should be used in addition, but as a single control measure treatment of proved value is superior to prophylaxis for these infestations in these animals.

In human medicine preventive medicine is fast coming to the front and threatens in time largely to supplant individual treatment, but in veterinary medicine, owing to the nature and habits of our domesticated animals, treatment of sick animals promises to be the most essential measure, so far as parasites are concerned, for many years after preventive medicine outstrips treatment among human beings. The practicing veterinarian can look forward with confidence to being an essential element in the control of parasitic diseases for many years, regardless of whether the practicing physician is meanwhile supplanted by the public health officer.

In passing it may be said that, so far as the parasitic diseases are concerned, treatment is prophylaxis. The destruction of adult parasites constitutes an interruption to the life cycle quite as definite as the destruction of larval forms and intermediate

hosts or the provision of conditions unfavorable for such larvæ or intermediate hosts.

THE APPLICATION OF THESE PRINCIPLES

With these principles in mind we may now proceed to consider briefly some of the more common parasitic diseases of our livestock with reference to the present status of treatment and of prophylaxis in particular cases. It is not intended to cover these subjects in detail, but only along broad lines.

Parasites of the Horse

Bots.—We have at present a quite satisfactory treatment for bots in the use of carbon bisulphide in hard capsules in doses of 6 drams given without purgation. This treatment should be given in the fall, for choice, after the adult flies have disappeared, to protect the horse from the effects of the bots during the winter and spring. Knowing the life history of the flies, and knowing that they deposit their eggs on the horse, measures to prevent egg-laying during the summer should be used wherever feasible. Some of the measures advocated do not appear feasible or practical. It has been suggested that horses be kept in the stable during the day and turned on pasture at night when the insects are not flying, but for the most part horses are needed for work in the daytime and such a prophylactic system presupposes a life of leisure that is not led by most horses. Clipping a horse to prevent the flies laying the eggs on the hairs has been recommended and may be a useful measure under certain circumstances. The use of kerosene or phenols on the manure to destroy bots passed after treatment has also been recommended. This is a waste of time and money. If carbon bisulphide is used, the bots will be dead; if anything else that will not kill bots is used, there will be no bots to kill in the manure. The application of fly repellents to horses has also been recommended as a control measure. Unfortunately, we have nothing as yet which approximates an ideal fly repellent. Water emulsions, such as the coal-tar products, are cheap and easily applied, but the effects are transient. Repellents made up with oily or fatty bases are usually objectionable on the score of dirtiness, though they are usually more lasting in repellent effect. Mechanical protection by means of fringes, muzzle baskets and other devices are sometimes used and some of these afford a fair measure of protection.

Ascarids.—The same treatment that is effective against bots is also effective against ascarids. Prophylaxis is not difficult in the case of stabled animals not on pasture. The manure carrying the ascarid eggs can be disposed of properly. Prophylaxis is not readily applicable in the case of animals on pasture, and here treatment must be depended on as the primarily important thing.

Strongyles.—The case of these worms is similar to that of the ascarids. We have an effective treatment in the administration to animals fasted 36 hours of 4 to 6 drams of oil of chenopodium, followed immediately by 1 to 2 pints of linseed oil or an aloes ball. Proper manure disposal is prophylactic for stabled animals, but treatment is feasible and prophylaxis is not feasible in the case of pastured animals, except where stock rotation is possible.

Habronema.—Owing to the fact that these worms live in the mucosa of the stomach as well as in the lumen, no treatment is known at present that will remove all of the worms present. On the other hand, some species have an intermediate stage in the ordinary horsefly, and these flies breed for the most part in horse manure. The most favorable conditions for breeding are in the piles of manure about the yards and stables rather than in the manure scattered about the pastures by horses in grazing. Hence control measures in the way of suitable handling and disposal of manure are feasible, and at the present time prophylaxis is of more importance in the case of these worms than is treatment.

Pinworms.—As these worms are readily removed by the use of chenopodium as given to remove strongyles, and as prophylaxis has the same difficulties as in the case of the ascarids and strongyles, treatment is a matter of primary importance in the case of these worms.

Tapeworms.—So far as the tapeworms of the horse are concerned we have so little definite, well-established information in regard to treatment and are so much in ignorance as regards their life history that both treatment and prophylaxis must be regarded as problems for investigation.

Flukes.—Flukes are of little importance as parasites of the horse in this country. Treatments have been established for some flukes in other animals and could doubtless be adapted to the horse if necessary. Prophylaxis is known and to some

extent practical and will be discussed in connection with other host animals.

Parasites of Cattle

Ox warble.—Treatment for ox warbles is surgical in nature and is a feasible and practical affair. The removal of the warbles from the back and their destruction relieves the animal of its parasites and, like other treatments, is of value as prophylaxis in diminishing the supply of the parasites in the future. Purely preventive measures have been investigated by Imes and Schneider of the Bureau of Animal Industry, who have found the use of wading tanks containing insecticidal and fly-repellent solutions for wetting the legs below the hocks and knees of considerable value in protecting cattle from warbles. They recommend a 2 per cent solution of a coal-tar creosote dip.

Stomach worm.—For reasons already discussed, cattle on pasture—and this is especially true of young animals—can be treated for stomach worms at intervals of a month to more advantage than they can be protected from these worms by prophylactic measures applicable to the average farm. Where animals are kept up and fed from racks, ordinary cleanliness is an applicable prophylactic measure.

Hookworm and nodular worm.—Prophylactic measures are difficult to apply in the case of these parasites, as in the case of most nematodes of the digestive tract where animals are on pasture. The situation is further complicated by the fact that cattle doubtless are infested cutaneously by hookworms, as other animals are known to be. Treatment is still a matter for investigation. In the case of the sheep hookworm, Lewis and Guberlet report excellent results from the use of a solution containing 1 per cent copper sulphate and 1 per cent tobacco. The same treatment may prove of value in the case of cattle. So far as nodular worms are concerned, a treatment remains to be developed. The larval worms in the nodules must be regarded as inaccessible to treatment at the present time, and we have yet to find a satisfactory treatment for the adult worms in the lumen of the large intestine.

Tapeworms.—Our ignorance of the life history of these worms precludes our formulating definite prophylactic measures for their control. As regards treatment, we find that the repeated administration of the copper sulphate treatment materially diminishes the number of tapeworms present, and Lewis and

Guberlet report the removal of 75 to 100 per cent of these worms by the use of the copper sulphate and tobacco solution noted above in connection with hookworms.

Flukes.—Both treatment and prophylaxis appear to be of value in the control of the common liver fluke. European investigators report good results from the use of male fern and its components in repeated doses in removing these worms. Prophylaxis is based on the known life history and the fact that snails act as intermediate hosts. The avoidance of wet pastures or the filling and draining of such pastures to render them unfavorable for the development of snails are indicated measures. Another control measure recommended by Chandler consists in the destruction of snails by the addition to standing water, or streams, of copper sulphate, approximately 1 part to 1,000,000 parts of water, or 1 ounce of copper sulphate to 7,800 gallons of water.

We have as yet no treatment for the large liver fluke in cattle. Prophylaxis is the same as for the common liver fluke.

Parasites of Sheep

Grub in the head.—In the case of this parasite, radical treatment consists in surgical measures, trephining to open the nasal sinuses and the removal of the grubs. This is a rather elaborate procedure for the parasite involved and in most cases seems unwarranted on the basis of cost in comparison with damage done by the parasite. Fumigation and other measures designed to cause the removal of the grubs by sneezing can hardly be expected to remove many of the grubs, and fumigation with sulphur dioxide is dangerous. On the other hand, a simple prophylactic measure, consisting in smearing pine tar on the nose of the sheep to prevent the fly from attacking, appears to be satisfactory in actual practice. By putting this tar in holes bored in planks or along a V-shaped trough and putting salt in the holes or the trough, the process can be made practically automatic, thereby saving the labor of applying the tar and renewing it. In this case, prophylaxis appears to be more important and feasible than treatment.

Stomach worm.—The case of this parasite has already been covered. Treatment once a month with the cheap copper sulphate solution is a rapid and effective control measure. The commonly recommended prophylactic measure, pasture rotation,

is a valuable aid where it is applicable, but it is rarely applicable under the conditions where it is most needed. On the range country of the West it is more or less applicable, but the dry western range is itself not favorable to stomach-worm development, and the losses from this source are usually on the more valuable soil in the moister climate of the East, Middle West and South, and the value of the land is here correlated with limitations on the amount of pasture available for rotation.

Hookworm, nodular worm and tapeworm.—What has been said of similar parasites in the case of cattle applies here for the most part. Prophylaxis is difficult in the case of the nematodes and unknown in the case of tapeworms. Treatment for nodular worm remains to be developed. The treatment for hookworm and tapeworm by means of the copper sulphate and tobacco solution is indicated, and as this is also a treatment for the removal of stomach worms, the use of such a treatment monthly throughout the year, or at least during the spring, summer and fall, will serve the purpose of controlling all these worms.

Flukes.—This subject is covered in what has been said of flukes in cattle.

Parasites of Swine

Ascarids.—In the case of these worms we have adequate treatments and have recently learned something of the efficacy of a simple prophylactic system. Treatment with oil of chenopodium accompanied by an adequate purgative is quite effective, though the farmer is still searching for a treatment which can be given satisfactorily in the feed. Anyone who has handled a large, noisy hog will appreciate the farmer's position in the matter and will be pleased to see some such treatment developed. At present we are forced to observe the nice balance between the amount of poison that will kill worms without killing hogs and the amount that will kill hogs also, by means of fasting and appropriate individual doses.

The prophylaxis which has been developed by Dr. Ransom and Dr. Raffensperger is the so-called McLean County system. This system is primarily designed to protect the young pig, since pigs are much more easily infested during the first months of life and suffer more severely from the effects of worms at that time. Under the McLean County system, sows are carefully washed to remove dirt and adherent worm eggs and put into

thoroughly cleaned farrowing pens just before farrowing. Within two weeks after farrowing the sow and pigs are removed from the farrowing pen to clean pasture which has been cultivated and sown to forage crops, and are kept there away from other swine for a period of about four months. After this time they are much more resistant to infection by worms and to the results of worm infestation, though the protection which is afforded by cleanliness about the hog yard should be given them. This system has been very satisfactory in protecting pigs from ascarid pneumonia, thumps of verminous origin and the effects of ascarids in the digestive tract. Treatment will be necessary for swine ascariasis for many years, and is indicated wherever infestation occurs, but prophylaxis of a simple and practical sort promises to be an increasingly large factor in the control of this disease.

Kidney worm.—The kidney worm occurs in the perirenal fat and in the liver for the most part, and hence in places not accessible to treatment by any method known at present. The life history, according to those who have worked on this subject, is as follows: The eggs of worms in the perirenal fat pass through fistulous tracts into the ureters and out in the urine, the urine, and not the feces, being the source of renewed infestation in this case. The eggs hatch and give rise to larvæ which may enter the pig by way of the skin or by way of the mouth. Those larvæ entering by way of the skin arrive in the perirenal fat, in a position to carry on the life cycle, while those entering by way of the mouth arrive in the liver, apparently going astray and leaving the path which makes it possible to carry on the life cycle. Since the urine is the source of infestation, and since the skin is the normal point of attack for the larvæ, the hog wallow must be looked upon as the place where infestation is most likely to take place. The evident prophylaxis appears to be the substitution of a sanitary concrete wallow for the old mud-hole. Into this wallow one may put cresol compounds which will destroy the worm larvæ as they hatch, and the same compounds will aid in controlling external parasites of swine.

Parasites of Dogs

Ascarids.—We have adequate treatments for ascarids in dogs. *Chenopodium* given with a suitable purgative is quite effective, and carbon tetrachloride appears to be a promising drug for

removing these worms. Prophylaxis is a matter of sanitation and cleanliness. It is applicable in the case of the household pet, if the owner of the dog cares to apply it. It is not equally applicable in the case of the sheep dog, the hunting dog, the watch dog and other dogs which have to live out of doors where they are not subject to the same oversight and care. However, the application of sanitary measures in the case of pups, comparable to the measures utilized in the McLean County system in the case of swine, would doubtless tide the pups over the worst danger period.

Hookworms.—The work done up to this time with carbon tetrachloride indicates that in it we have at last a drug capable of removing the hookworms of dogs and doing so without appreciable injury to the dog. If it lives up to its promise it will go a long way toward doing what the Rockefeller Foundation calls “unhooking the hookworm.” In passing it may be mentioned that the first reports coming in on the use of this drug for removing hookworms from foxes are very favorable as regards both efficacy and safety. As in the case of the ascarid, prophylaxis in the case of the dog hookworm depends largely on the control we have of a dog’s habits. Control may be quite complete in the case of a lap dog or house dog, or quite inadequate in the case of the hunting dog and other dogs mentioned. For the latter groups of dogs treatment appears to be the important thing. What has been said in regard to protecting pups from ascarids applies also in regard to protecting pups from hookworms. The young animals are the most susceptible and suffer most from them.

SUMMARY

The relative value of treatment and prophylaxis in the case of parasitic diseases may be ascertained by the application to a given case of certain elementary principles. A treatment or a prophylactic procedure must be effective and practical.

Where the application of these principles indicates that treatment is feasible and prophylaxis is more or less theoretical and impractical, we should devote our attention to treatment and make prophylaxis a secondary matter, using it so far as it can be used, but not depending on what experience shows to be undependable.

Where prophylaxis is feasible and treatment unknown or unsatisfactory, prophylaxis is always in order, since it is the

ounce of prevention which weighs more than the pound of cure.

As regards the present status of some of the more common parasites of our domesticated animals, we find on examination the following:

Treatment appears to be more practical and satisfactory than prophylaxis in the present state of our knowledge and under present conditions for the control of bots, ascarids, strongyles and pinworms in horses, of stomach worms, hookworms and tapeworms in cattle and sheep, and of ascarids and hookworms in dogs which live and work out in the fields.

Prophylaxis appears to be more practical and satisfactory than treatment in the present state of our knowledge and under present conditions for the control of *Habronema* in horses, the large liver fluke of cattle, grub in the head in sheep and kidney worm in swine.

Treatment and prophylaxis are both important and valuable for the control of ox warble in cattle, the common liver fluke in horses, cattle and sheep and ascarids in swine.

Neither treatment nor prophylaxis is satisfactory in the present state of our knowledge in the case of tapeworm in horses and nodular worm in cattle and sheep.

The foregoing findings may be modified under given conditions. Thus prophylaxis against ascarids and hookworms in pups might be made of primary importance.

NEW FILM "EXIT ASCARIS" WELL RECEIVED

The American Association for the Advancement of Science and affiliated organizations witnessed the first public showing of the motion picture "Exit Ascaris" at a meeting held in Toronto, Canada, December 29. The film, which shows in story form the practical application of a method devised for controlling roundworms in swine, received the warm approval of the scientists.

Dr. B. H. Ransom, Bureau of Animal Industry, who developed the method for roundworm control, accompanied the motion-picture presentation with a short address. The new film is especially applicable for showing in the Corn Belt and other important hog-growing regions.

TUBERCULOSIS IN A SHETLAND PONY ¹

By B. A. BEACH, F. B. HADLEY and H. B. PIPER

*Wisconsin Agricultural Experiment Station, Madison,
Wisconsin* ²

THAT TUBERCULOSIS is a disease which occurs very infrequently in American horses is shown by the fact that only five cases have been found recorded in our veterinary literature. None of them appears to have been in a Shetland pony. One of these cases was reported by Shigley (1), another by Fink (2), two by Pickens (3) and one by Barnes (4).

A considerable number of cases of equine tuberculosis have been reported from various countries of continental Europe, while 43 cases have been recorded by Hoare (5) as occurring in the British Isles between 1888 and 1911. An analysis of these cases shows that 18 were cart horses, 10 harness horses, 2 well-bred animals, 1 troop horse, 1 Belgian stallion, 2 ponies, 1 cob, 1 Hackney yearling, and 7 horses the breed of which was not stated.

Since only two ponies are included in the above lists, the writers feel that the case to be described is so unusual that it warrants recording, more especially because Koch's rules to prove the specificity of the disease have been satisfied.

The subject was a Shetland pony, six years of age, that had been kept for the two years previous to her death as a children's pet. A very good idea of her size may be had by comparing her with the children astride her back, as shown in the accompanying photograph. The farmer who raised this pony and owned her during the first four years of her life stated that her dam is still alive and apparently healthy. None of the dam's other progeny has ever shown symptoms of any infectious disease. He also said that the pony had not been fed cow's milk while a foal or afterwards. It was learned that the last owner had tuberculosis in his herd of dairy cattle. This was demonstrated when a cow was butchered on the farm where the pony sickened and died. The carcass of this animal, when

¹ Presented at the fifty-eighth annual meeting of the American Veterinary Medical Association, Denver, Colo., September 5-9, 1921.

² Published with the approval of the Director of the Wisconsin Agricultural Experiment Station.

opened, was literally a mass of tubercles, all organs of both the thoracic and the abdominal cavities showing lesions. Although the pony was not directly associated with the cattle, there was plenty of opportunity for her to acquire the infection from them, both through contaminated feed and the drinking water in the common trough.

According to the last owner, the pony had been sleek, fat and in the best of health until early in the summer of 1920. At this time the animal began to lose flesh and gradually became debilitated. Even with the best of care, feed and medicinal



A Shetland pony that died of tuberculosis

treatment no improvement was made. Finally on December 23 the pony died, and one of the writers (Piper) was requested to make a postmortem examination.

This examination revealed an enormously enlarged mesenteric lymph gland which was rather ovoid in shape and measured about 8 by 10 inches. When incised it was found to be largely composed of a cheese-like material, resembling avian pus in appearance, but there was no evidence of calcification, as is the rule in cattle and in hogs. Numerous pea-size to walnut-size nodules, resembling the "pearls" of bovine tuberculosis, were observed beneath the serous covering of the neighboring intestine, the abdominal wall and the diaphragm. Adhesions had taken place between all involved serous surfaces. The spleen and lungs showed no macroscopic lesions; they were not examined microscopically.

A microscopic preparation of material from the centers of one of the small tubercles was made and stained for acid-fast microorganisms. Literally hundreds of bacilli were revealed by the aid of the microscope. This is in marked contrast to the paucity of bacilli that are found, even in very active cases, in tuberculous lesions of cattle and swine. These bacilli were rather longer than the human tubercle bacillus and were distinctly nodulated.

A cockerel was inoculated subcutaneously with 1 c.c. of an emulsion made by macerating a nodule in normal salt solution. This was done because the organism simulated the avian tubercle bacillus and we wished to establish the type or variety of the tubercle bacillus which was responsible for the original infection. Two guinea-pigs were inoculated in the same way with the same quantity of emulsion. Suitable culture media were also inoculated directly from the lesions as another means of recovering the organism.

The cockerel was observed for eight weeks, but showed no symptoms of disease during this period. It was then killed and a careful postmortem examination made, but no lesions of tuberculosis could be demonstrated.

Guinea-pig 1 gradually lost weight and died five weeks after being inoculated. At time of inoculation it weighed 520 grams and at death 409 grams. The following organs revealed lesions of tuberculosis: Lungs, liver, spleen and mesenteric lymph glands. Microscopic preparations from these organs showed the characteristic acid-fast organisms in enormous numbers.

Guinea-pig 2 weighed 555 grams when inoculated and 420 grams five weeks later when it was killed. It showed extensive lesion of the disease in the liver and spleen. *Bacterium tuberculosis* was demonstrated microscopically in the lesions.

An emulsion made from the liver of the latter guinea-pig was inoculated into a healthy guinea-pig, 3. This animal was killed 23 days later and showed tuberculosis infection of the liver and spleen.

Other inoculations were made as shown by the data in the accompanying table. Of particular interest is rabbit 1, which gradually lost weight and was destroyed 10 weeks after inoculation. Its liver showed lesions that might have been taken macroscopically to be miliary tuberculosis, but it was impossible

EXPERIMENTAL ANIMALS INOCULATED WITH TUBERCLE BACILLI OF EQUINE ORIGIN

Animal	Date inoculated	Initial weight (grams)	Source of inoculum	Method	Final weight (grams)	Fate	Lesions
Cockerel	Dec. 27, 1920	?	Tubercle of pony.	Subcutaneously	?	Killed Feb. 21, 1921	None.
Guinea-pig 1	Dec. 27, 1920	520	do.	do.	409	Died Jan. 31, 1921	Generalized
Guinea-pig 2	Dec. 27, 1920	555	do.	do.	420	Killed Feb. 2, 1921	Liver and spleen.
Guinea-pig 3	Feb. 2, 1921	260	Guinea-pig 2	do.	196	Killed Feb. 25, 1921	Point of inoculation and spleen.
Guinea-pig 4	Feb. 25, 1921	470	Guinea-pig 3	do.	317	Killed March 29, 1921	Liver and spleen
Rabbit 1	March 29, 1921	2,113	Guinea-pig 4	do.	1,935	Killed May 6, 1921	Nontuberculous lesions, liver.
Guinea-pig 5	May 6, 1921	490	Rabbit 1	do.	541	Killed July 8, 1921	Nontuberculous lesions, liver.
Guinea-pig 6	May 10, 1921	350	Culture pig 2	do.	293	Killed June 7, 1921	Generalized
Rabbit 2	May 10, 1921	2,090	do.	do.	1,796	Died June 29, 1921	Both lungs and kidneys.
Rabbit 3	May 10, 1921	1,260	do.	do.	1,107	Died June 28, 1921	Double tubercular pneumonia and left kidney.

to demonstrate the organisms microscopically. A large encapsulated abscess was noted at the point of inoculation. Guinea-pig 5, which was inoculated from rabbit 1, showed a liver studded with nodules as large as small peas and filled with caseous pus, exactly like the liver of the rabbit from which it was inoculated. No acid-fast organisms could be demonstrated microscopically. The conclusion was that neither of these animals was infected with tuberculosis, as the rabbit lost relatively little weight, while the guinea-pig gained markedly in weight after being inoculated. Moreover, the microscope failed to reveal the characteristic tubercle bacilli even after repeated search.

By comparing the pre-injection and post-injection weights of the experimental guinea-pigs, as shown in the table, it is seen that the weight curve changed characteristically. In the opinion of De Witt (7) the weight curve of guinea-pigs may be used in testing the effect of tubercle bacilli, for which it is one of our best guides. Notice is particularly directed to guinea-pig 5, which gained more than 50 grams and was found free from tuberculosis when autopsied, while all the other guinea-pigs that were found to be tuberculous lost weight.

This study convinces us that the bovine type of *Bacterium tuberculosis* was the microorganism which caused the disease that resulted in the death of this pony, rather than either the human or the avian type. This conclusion was arrived at after we had succeeded in eliminating the avian type by direct inoculation of the cockerel, and after noting the growth characteristics of the organism in both guinea-pigs and rabbits, as well as on culture media. The fact that this strain was highly virulent for experimental animals would, according to Cobbett (6), indicate that it was derived directly from the ox.

The duration of the disease in this pony appears to have extended over a period of about nine months. This shows that tuberculosis in the horse is likely to assume the chronic form and develop slowly as it does in other species of farm animals.

The nature and location of the lesions in the pony point to the digestive tract as the portal of entry for the infectious organism. Apparently the large mesenteric lesion was the primary focus from which other organs became infected.

NOTE.—Since the foregoing was written, three more cases of tuberculosis of equines have been reported by Dr. F. Boerner, Jr. (8).

REFERENCES

1. SHIGLEY. Amer. Vet. Rev., vol. 41, p. 85.
2. FINK. Amer. Jour. Vet. Med., 1916, vol. 11, p. 143.
3. PICKENS. Cornell Vet., 1918, vol. 8, p. 9.
4. BARNES. Jour. Amer. Vet. Med. Assoc., 1919, vol. 8, p. 672.
5. HOARE. A System of Veterinary Medicine, 1913, vol. 2, p. 164.
6. COBBETT. The Causes of Tuberculosis. Cambridge University Press, 1917, p. 467.
7. DE WITT. Jour. Infect. Diseases, 1920, vol. 27, p. 503.
8. BOERNER. Jour. Amer. Vet. Med. Assoc., 1921, vol. 12, p. 184.

INTERNATIONAL CONGRESS ON COMPARATIVE PATHOLOGY

The program for the Second International Congress on Comparative Pathology, to be held at Rome beginning September 20, 1922, has been announced by Prof. E. Perroncito, chairman of the executive committee. The subjects to be presented cover a wide range in the pathology of man, animals and plants, as follows:

1. Experimental grafting.
2. Regeneration of the nerves in experimental pathology, nervous diseases and war lesions.
3. Vitality of animal and vegetable parasites.
4. Present state of the cancer problem.
5. Vitamins and deficiency diseases in man and animals.
6. Filterable-virus diseases.
7. Foot-and-mouth disease.
8. Rinderpest.
9. Fowl cholera.
10. Bee plague.
11. Disease of silk-worms.
12. Bacteriophages.
13. Bacterial and plant tumors.
14. Piroplasmoses.
15. Symbiosis and parasitism in plants.
16. Cycle of evolution of *Dibothryòcephalus latus*.
17. Cycle of evolution of ascarids.
18. Cycle of evolution of ankylostomes.
19. Scabies of man and animals.
20. *Diaspis pentagona* and *Prospartella berleseii*.
21. Questions relative to phylloxera.

Other subjects may be added on the proposal of members of the congress before April 1, 1922.

THE PRACTICING VETERINARIAN AND THE ACCREDITED HERD WORK ¹

By J. G. TOWNSEND, Racine, Wisconsin

WHEN I was invited to read a paper on this subject before this conference, I felt that one of my few years of experience was hardly the proper person to appear here. It was only because I was assured that the viewpoint of a young practitioner was what was desired that I consented. Current professional literature is full of articles commenting on the small number of men matriculating in the veterinary colleges throughout the country, and it is worthy of thought that the attitude of a man entering into the profession at this time should be considered. It is for that reason only that I feel at all justified in presenting my attitude for consideration.

To a man starting to build up a practice in a great dairy State, the problems of tuberculosis and its control form no insignificant part of the task before him. I have heard quite a few men, recent graduates, who were so impressed with the magnitude of the proposition and responsibility involved that they expressed a desire to avoid this responsibility and do no tuberculin testing at all. Whether or not they have since gained confidence, or whether they still persist in this attitude, I do not know, but at any rate that is the way this proposition looms up.

To a man who has started practice since its inauguration, the accredited-herd plan presents perhaps a somewhat different aspect from what it does to the older practitioner. In the territory in which I practice there were a number of herds under supervision at the time I located there. The owners of the larger purebred herds, and, of course, the smaller ones also, while they were desirous of having their herds clean, were also most anxious to have the work done so that they might have the same advantages. That is, they wanted to be able, in competing with other breeders, to state that they were under Federal-State supervision. This was no more than fair, of course. I have taken the stand that when one of these men spoke to me about testing his herd I was simply doing my duty to him, as my client, to ex-

¹ Presented at the Tuberculosis Conference, Chicago, Ill., November 25 and 26, 1921.

plain to him the advantages he might derive, commercially, by putting his herd under supervision with a view toward having it accredited.

There is, of course, in this proposition the immediate and very tangible fact, especially to the young practitioner, of the loss of the fees involved. I feel that by following this course the practitioner will not be any the loser, unless the increased confidence and respect of these clients is without value.

I believe, however, that an effort should be made by all interested in the educational and extension work for this plan, to be certain that the real benefits are not depreciated by emphasizing the fact that it is free work. It is difficult to talk to the man with a herd of ten or twelve grades and a scrub bull who comes to you and asks that "next time that man that tests So-and-So's herd is down, have him come and test my herd." With the men who want accredited herds and who benefit by them, the question of cost is not an important item. One of my clients, owner of a large herd under Federal-State supervision, stated to me that the increased value of his cattle would more than offset the usual fee for tuberculin testing. This, I think, is the attitude of the great majority of owners of purebred herds. There are, however, those to whom the Federal-State accredited test will never mean anything more than a free test.

It has occurred to me that under present economic conditions some owners whose herds have been accredited may feel as some have felt regarding hog cholera work—that they can afford to run the risk of omitting subsequent tests. I feel that it is due the veterinarian that the Federal-State authorities urge the further cooperation of the breeder. There surely should be provision made so that it will be necessary for a man to make an effort to hold the ground gained if he is to have further cooperation from the Federal-State authorities. I mean, though this situation may not at any time prevail, if a herd is placed on the accredited list and the owner omits to test the ensuing year, his herd, under the ruling, ceases to be accredited. Will it then be possible for him to reapply and have that herd again placed under State and Federal supervision? A letter should be written to the owner of a herd at the time his certificate is issued calling his attention to the fact that he must have a test made by an accredited veterinarian in order to maintain his herd

on the list. Another letter at the eleventh month, reminding him that a test must be made some time during the next thirty days, would be a good follow-up measure.

In regard to the supplementary list, comprising herds which have passed virtually the same requirements as a fully accredited herd, two clean annual tests, but in which a reacting herd bull is kept, I do not suppose that there will be any appreciable number of such herds. However, as these herds are not fully accredited, I presume that such herds would be tested by Federal-State inspectors. Here is a situation in which I feel that the local veterinarian, who virtually has the herd under his constant supervision, might be used to advantage if he can be used anywhere.

Personally, I believe that we are doing more tuberculin testing. I have had tests to make for all but one of the herds in my territory that are under Federal-State supervision. In cases where the Federal forces have aided in area work and large numbers of herds have been placed on the accredited list, I believe that if even only 10 per cent of these herds are returned to the local practitioner it will be more tuberculin testing than was ever available before.

From the Department of Agricultural Bacteriology, University of Wisconsin, I have the following figures relative to the amount of tuberculin sent out to veterinarians:

Year	mils
1917-18	260,000
1918-19	351,000
1919-20	451,000
1920-21	498,000

Occasional requisitions are made on the Federal Department, and some is furnished by biological houses. If this reflects at all the amount of testing done by the veterinarians, it can not be that the work done by the Federal-State inspectors is causing much decrease in the amount of work available for the local practitioner.

The cooperation of the practicing veterinarian is vital to the success of any attack on any infectious disease. At this point, as a practicing veterinarian, I want to thank the gentleman from Virginia, Dr. J. G. Ferneyhough, for the splendid brief he presented for the practicing veterinarian this morning. Under the

present conditions the herd tested under Federal-State supervision has an advantage we can not give—the certificate of health carrying the weight of Federal-State authority. As this is the very feature that most of our clients want, I feel that we must try to procure it for them by the only means at our disposal, cooperation to the extent of our ability with the Federal-State authorities.

I take this opportunity to express my appreciation of the courtesies and cooperation given to me by the Federal and State authorities of the State of Wisconsin.

Dr. W. M. Gordon, an active member of the A. V. M. A., has been appointed City Meat Inspector for the Health Department of Omaha, Nebraska.

Dr. M. J. Kemen, formerly in Bureau service and who resigned May 4, 1920, was reinstated November 16, 1921, and assigned to hog cholera control work in Mississippi.

Dr. E. W. Nye, assigned to hog cholera work in Mississippi, has been transferred to the same class of work in Texas, effective December 1, 1921.

Dr. J. C. Burneson of Cleveland, Ohio, who left the Bureau service October 14, 1920, has been reinstated and assigned to hog cholera work in Kentucky.

Dr. A. H. Julien of Columbus, Ohio, engaged in hog cholera control work in that State for a number of years, has been transferred to the same class of activities in North Carolina.

Dr. and Mrs. Adolph Eichhorn of Pearl River, N. Y., were in attendance at the Cuban Medical Congress, which was held at Havana, in December, 1921. They report a most interesting and successful conference, with much pleasure and entertainment intermingled with an instructive scientific program. On returning the Eichhorns spent a week at the various Florida resorts. Readers of THE JOURNAL may anticipate an interesting review of the congress from Dr. Eichhorn's pen in the near future.

RELATIONS OF THE VETERINARIAN TO HUMANE WORK¹

By W. G. HOLLINGWORTH

Utica, New York

TO BE A SUCCESS in life should be the height of ambition of everyone. There has been no time in the world's history when opportunities were so great as at this very hour. While this is true, we must admit at the same time that the services demanded from all of us are very much greater today than ever before. Because of this condition mediocre men and women still constitute the very large majority. Look around in your own community, think of all the people you know well; how many are there who are doing anything to make their services more valuable to the institution that employs them, or to live up to the Latin phrase, "Non nobis solum," which means, "Not for ourselves alone but for others"? The great trouble with us is that we are selfish and do not try to cultivate ourselves against selfishness. We were all brought into this beautiful country through no fault or desire of ours. It is the duty of those who are responsible to bring up the rising generation to be physically, morally and mentally right. As unselfishness is one of the blocks that go to make up the arch of success, children must be instructed properly from the start to practice it. Success as an individual affair. It does not come by wishing for it, but we must work for it. We must take the initiative to do the right thing at the right time without being told.

Vocation if rightly selected is another one of the blocks that go to make a success in life. There are two things that happen to a young man at the time of life when he is not as a rule capable of solving such serious problems. One of them is selecting his right vocation; that is, the work he is adapted to; and the other is selecting the right kind of a young lady for his life companion, his wife. A misjudgment of either spells success or failure in his life. In regard to my own profession, and using myself as an example, if I have made any success in my career, it is due to the fact that I selected the veterinary profession for my vocation because I found that I was adapted to it, and that

¹ Presented at the State Convention of Anti-Cruelty Societies, Utica, N. Y., Oct. 1-5, 1921.

I selected a lady for my wife who is kindhearted, sympathetic and naturally loves animals and loves to love and loves to be loved.

Being enthusiastic in my work and clamoring for knowledge, I want to be progressive. If I were to stand still I would be retrograding, and, such being the case, I feel that there are many others in my class. I also feel that there are great opportunities for the right kind of young men to enter veterinary colleges that stand for higher educational qualifications, one whose director or dean will ferret out of the prospective student whether he has the qualifications necessary for a young man to have to make an ideal veterinarian, one who is going to be a success and not a failure. Of the latter class we have now more than we want, maybe not any more than other professions. Our profession needs men who possess the higher ideals of man, faithful husbands, and loving fathers.

We now come to the point of finding ourselves working, thinking and feeling in relation to new environments. After all, the mark of an educated man is his breadth of sympathy and appreciation, and this depends upon his knowledge of the lives of other men. The progress of man lies in his ability to adapt himself to ever-changing and ever-growing environments. In this progress our schools and universities must be leaders. It is their business so to educate young men and women that they will be able to cope with the conditions of affairs, understand them and be able to practice and teach them. This slowly gaining educative work has the approval of the public and consequently will succeed. Education is slower than legislation, but it is sure. Such being the case, we must have the continued support of the church and state, and each must do its part. This is the era of the universal teaching of humane methods. Christian education is the foundation which we must build upon, and it must be so substantial that it will hold up any structure that is built upon it. Humane work is purely educative, and in order to make our commonwealth a better place to live in and make better citizens we must enforce higher education. That being a fact, all money that is set aside and spent for this work is well spent, coming from whatever source it may.

In a moral sense, words can hardly express what effect such efficient work can do in any community. I think it is the duty of all of us to take a yearly inventory of ourselves. Just go into

some quiet corner, sit down and think, and ask ourselves, Have I led a pure life? Have I done my duty to my fellow men? What can I do to better myself? What can I do to help others to lead a more righteous and humane life? By so doing you will prove to your friends as well as those who are not, that you mean to do right, you intend to be right, you are going to be as nearly right as you possibly can; then if you make a mistake through no fault of yours, you ought not to be too severely criticised.

In the words of President Harding, "Humanity never needed a broad, illuminating understanding more than it does now." I can think of no greater service I could render than to impress upon every one the part that awaits him or her in humanity affairs, if he or she will but realize it. I implore a dedication to common service, to humane betterment, to civilization's advancement, on the part of the people, especially the young people, who at last must so largely direct the affairs of this country and society in the future.

If there is to be built up in our country a firm structure of humanity of the people, the children are logically the foundation upon which the structure must rest. Humane education of children is therefore vital, as the child of today is the citizen of tomorrow. It is quite necessary for those who are holding positions of instruction to practice outside of the school room what they preach in it, whether it be a high school or university. By so doing they will instill in the student's mind the necessity of applying their motives and character during their spare time, and their companionship, in putting into force the slogan, "Be kind to animals." To prove that this theory is correct, I purchased 10,000 of these buttons and had them distributed among children, young and old, in different schools in all grades; and I am confident that they stimulated the young people's minds and found fertile soil which might have lain dormant. As a result the parent was finally reached and in many cases enthusiastic humanitarians were developed.

This great and glorious country, possessed of all its resources, capable of feeding besides its own population the starving of Europe, is dependent upon one class of loyal American citizens, whose problems are of the greatest magnitude, the man who holds the prosperity of this nation in his hand, whose day's work is never done and who is ready to respond to the call of

production, the agriculturist; and he is dependent on fertilization to enrich the soil so as to increase production; and fertilization is dependent on livestock, which amounts to the great wealth in this country (including pet animals and poultry) of ten billions of dollars; and the wealth of this great mass of living creatures is dependent upon the veterinarian, who is their guardian. So the agriculturist and the veterinarian must work together, and one can not do without the other. In order to get the results necessary to make this branch of agriculture more productive, the livestock must be cared for in as humane a way as possible. Through neglect and any of the conditions that lead to the same there are annually hundreds of thousands of dollars, yes, millions, lost; and here is where the veterinarian above all men is the one to instruct the tiller of the soil ways and means to prevent this great unnecessary loss. It is purely an educational affair.

We are living today in an era of prevention. Back of this is the public sentiment. That being the case, anti-cruelty societies are ever welcome. Whenever one exists, if a veterinarian is in the locality I believe it is his greatest asset to become closely associated, as his opinion is constantly sought in an advisory way, and he should carry out the motives in action. You will always find oversympathetic members, and very often a balancing power is necessary to instill in their minds that cruelty should be looked on from all sides. They should be broad-minded, to know that it is just as cruel to inflict unnecessary pain on one animal as another. Right here fashions have many followers. You see feathers and furs used by a great many people. Do they ever think back and consider what suffering the animal went through in order that such materials could be procured in order to decorate a human form?

I am glad to be able to call myself a veterinarian for the reason that I know of only one thing that is more lovable than to render services to an animal that is suffering that can not comprehend or show its appreciation for what you do for them and that is a lovely woman.

The veterinarian of today should practice and teach methods whereby all operations should be performed under local or general anesthetic when and where possible. It has been my privilege to lecture annually to veterinary students for quite a few years on this subject, and I am glad to say that this has

borne fruit. I have tried to have clinics at the association meeting follow out this plan, and I can see that in late years a wonderful difference in that line, for which I am very glad.

The position a veterinarian holds in his community is very far-reaching. One of the things he is seeing continually is cruelty, intentional or otherwise; and here again is where education will do a great amount of good. It is very much better to take up these cases as they come, sit down and educate the person to take into consideration the Golden Rule, "Do unto others as you would have others do unto you," than to go to court with them the first thing you do.

In conclusion, love some one; in God's name love some one; for this is the bread of inner life, without which a part of you will starve and die. Though you feel you must be stern, even hard, in your life of affairs, make yourself at least a little corner somewhere in the great world where you may unbosom and be kind.

Dr. H. S. Ijichi, a graduate of the Chicago Veterinary College, has been spending several months in post graduate work at New York University. After visiting the Bureau laboratories in Washington for ten days, he left for Europe and expects to reach his native land of Japan during the early summer.

Dr. Harry M. Martin, animal pathologist at the University of Nebraska, following the Livestock Sanitary Association meeting in Chicago, left for the East where he will spend the next six weeks visiting the laboratories at Columbus, Philadelphia and Washington, D. C.

Dr. Martin reports the illness of his chief, Dr. L. Van Es, who we trust will make a speedy recovery.

Dr. G. A. Roberts, formerly of West Raleigh, North Carolina, and now of the Veterinary School at Sao Paulo, Brazil, and Miss Ora M. Glenn of Lavras, Minas, Brazil, were married on December 1, 1921. They will make their future home at Rua Fagundes, 5a S. Paulo, Brazil.

Dr. Roberts' many friends in the United States will enjoy sending their best wishes to Dr. and Mrs. Roberts.

LIVESTOCK SHIPPING LOSSES AND SOME METHODS FOR PREVENTING THEM¹

By W. J. EMBREE

Chicago, Ill.

SOME of you, perhaps, are not acquainted with the work of the Western Weighing and Inspection Bureau, and for the benefit of those that are not, I will state that this bureau was organized many years ago for the purpose of checking weights for Western railroads. After its organization many inspection features were added. The veterinary inspection was started in the fall of 1917, at the markets of Chicago, Kansas City, St. Louis and Omaha. From this beginning the work was extended to St. Paul, Sioux City, St. Joseph, Oklahoma City, Wichita, Denver and Fort Worth, they being the 11 principal markets at which we are now operating and which I will hereafter mention. We are also doing some work at Houston and San Antonio, Texas, and at Little Rock, Ark. The purpose of our work is to discover the cause of death of livestock in transit and issue our findings to railroads and shippers, so that future loss may be prevented.

The subject matter of the message which is conveyed in the accompanying pictures refers principally to hogs, as they are our most troublesome animal in transit; and as we are so often called upon to explain these and similar things to laymen, it is couched in untechnical language. We, as veterinarians, by our association with shippers and producers of livestock, can do much to prevent loss in transit, and my message is principally for the purpose of calling your attention to a few things that you can pass along to places where they will do the most good. The subject of livestock loss in transit and its prevention is a large one, with many angles, but we have adopted the plan of concentrating on hogs, and you will plainly see why we adopted this plan. In our pictures and demonstrations we have used the month of June quite extensively for the reason that we find it to be an average month, and by using it we avoid extremely large figures.

In the month of June, 1920, the loss on grown cattle was one

¹ Presented at the fifty-eighth annual meeting of the American Veterinary Medical Association, Denver, Colo., September 5-9, 1921. Illustrated with numerous lantern slides.

dead animal to every 2,600 received. When calves are included with the cattle, the loss is 1 dead to every 1,100 received; sheep, 1 dead to 1,600 received; and hogs, 1 dead to every 300 received, which is approximately 1 dead hog to every three cars. This shows that the loss in hogs is more extensive than the loss in any other species of food animals, and for that reason we concentrate our work on the prevention of loss in hogs.

Since we have noted how much greater the loss is in hogs than in other animals, we will analyze the comparative cause of death of hogs and cattle. The cause of death in cattle is quite evenly distributed among several different diseases, and injury is the second largest one cause. Causes of death in hogs are not evenly divided. We have one great cause which is killing practically 65 per cent of the hogs; that is, acute diseases located in the lungs.

If we observe the construction of a fat hog—the heavy fat body and the short legs—it is easy to understand why hogs are especially susceptible to diseases located in the lungs. It would be impossible for an animal so constructed to move very freely on his feet. The length of the step is probably limited to 10 or 12 inches, and in moving 100 feet it would be subjected to probably ten times the exertion that a horse would be in moving the same distance. Hogs in their home pens are not required to exert themselves; their wants are supplied close at hand, and they are not required to move about much in order to keep their body needs supplied. In this way they grow fat and plethoric, their muscular system becomes impregnated with fat, and their heart and lungs do not develop. In fact, the digestive organs are developed at the expense of the organs of respiration and circulation. The lack of exercise causes the lungs to develop only sufficiently to meet the requirements of the condition under which the animal lives.

The function of the lungs is to purify the blood of the body, and in the hog perspiration (sweating) being almost impossible, a large part of the excess moisture and heat of the body is passed off through the lungs; therefore a hog with undeveloped lungs will suffer more quickly in hot weather than one in which that organ is well developed.

I believe it perfectly safe to say that hogs that are fattened quickly do not develop more than 80 per cent of the lung space which they normally should have. In other words, their heart

and lungs are developed sufficiently to keep them alive while at home, but are not in condition to keep them alive when they are subjected to the unusual exertion of being loaded and transported to market; and it is this hog with the poorly developed heart and lungs that comprises 90 per cent of our in-transit losses. The strain on these vital organs starts the minute the hog is removed from its home pen. It is first subjected to the trip to the loading point, which may be made in the most careful manner; but it is impossible to subject this hog to this trip without causing it to take more exercise than it has taken at any one time since it was a small pig. This exertion causes the heart to increase in action and the blood vessels of the lungs dilate and become overcrowded with blood. The hog pants and becomes short of breath, and if it is not immediately placed in a cool, quiet place where it can return to normal it will die of acute congestion of the lungs or other acute lung disease.

When an animal that is unaccustomed to exertion is forced to exert himself in hot weather the forced inspiration of warm air causes the capillaries of the lungs to dilate. The dilation of the capillaries restricts the air space, and as the condition advances the tissues of the lungs will become engorged with blood and the air vesicle itself may become filled with serum and blood, and as the condition advances the hog will suffocate for the reason that he can not purify the blood of the body.

Hogs are sometimes driven to the loading point on foot. This is a very bad practice. It is surprising in the investigation of losses in transit how many cases we find where the loss has occurred when hogs were driven on foot to the original loading point.

A good method of transporting hogs to the shipping point is to haul them in a wagon or truck. They are often exposed to great exertion, however, at the time they are rounded up for loading into the wagon or truck, and hogs can suffer greatly while being hauled in a wagon on a hot day if they are not shaded or wet down.

Great care must be taken that the hogs are not rushed in loading, and this can be avoided by the shipper giving himself plenty of time. A man who is crowded for time is likely to abuse and beat the animals in order to rush them into the pen to prepare them for loading into the car.

There are many factors that enter into the cause of death of hogs in transit. In hot weather manure and filth on the floor of the ear may become heated, causing the hogs to become restless and nervous so that they will not cool out after they are placed in the ear. Sand is the best bedding for the transportation of all livestock, especially in hot weather. Dirty, filthy ears do not seem to be as harmful for the transportation of cattle as they are for hogs unless the condition is very bad, but in all cases a clean, sanded floor gives the animals the best chance to arrive at market in good condition.

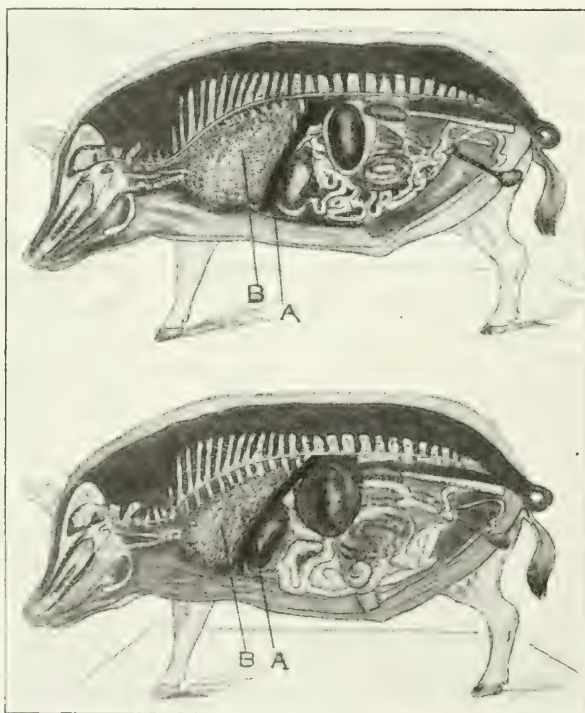


Fig. 1.—Upper figure shows relation of diaphragm (A) to lungs (B) when stomach and bowels are not full. Lower figure shows relation of diaphragm (A) to lungs (B) when stomach and bowels are full of food and distended with gas.

We now come to the matter of properly feeding animals before they are shipped to market. The drawing at the top of figure 1 represents the position of the digestive organs and lungs in a hog that is not full. The picture at the bottom shows the position of these organs when animals have been excessively

filled and the bowels are distended with gas. It can be seen that the lungs in the bottom figure do not have the room for expansion that they have at the top. When the matter of overfeeding is coupled with other conditions, such as driving and loading in dirty cars, the loss may be extensive.

In investigating a loss of 30 dead hogs removed from one car it was discovered that the hogs had been fed on pasture up to within two days of the time of shipment. At that time they were placed in a small pen and fed all they would eat. In addition to this 15 bushels of corn was placed in the car at the time of shipment. Four other shipments moving from the same station on the same day were not handled in this way. They arrived at market with no loss.

Overloading cars is another great cause of loss in summer as well as in winter. Statistics show there is only 50 per cent of the loss in lightly loaded cars that there is in those that are heavily loaded.

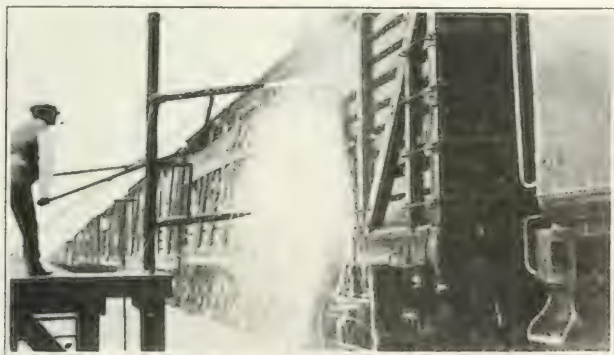


Fig. 2.—Apparatus used for sprinkling hogs in railroad cars in hot weather to prevent losses

The sprinkling or watering of hogs in transit is an important means of preventing losses in hot weather.

The shipper should wet the car thoroughly before the hogs are placed in it. A sprinkling apparatus that is in use by many of the railroads is shown in operation in figure 2. The advantage of this apparatus is that the water may be turned on and the train moved by a slow rate of speed, thus sprinkling hogs thoroughly without necessitating delay.

For many years some shippers have iced their hogs in transit in hot weather. About two years ago we came to the conclusion

that this was an excellent practice and since that time have issued many circulars in order to give information in regard to this subject. What we consider the best method of icing hogs in hot weather is to hang six ice bags in the roof of the car, with 50 or 75 pounds of ice in each bag. The ice will cool the car and the drip will keep the floor damp. We have found on actual experiments that 50 or 75 pounds of ice suspended in the car will remain effective for 20 or 30 hours. In July, 1921, 375 cars were reported iced, and only 19 dead hogs were removed from them, making a ratio of one dead hog to every 19 cars.

Table 1 shows the statistical results of the propaganda and circulars.

TABLE 1.—LOSSES OF LIVESTOCK IN SHIPMENTS RECEIVED AT PRINCIPAL MARKETS

Market	Species	Period	Number Received	Number Dead	Ratio
South Omaha.....	Hogs	June, 1919	302,617	600	1-500
		June, 1920	281,549	570	1-500
		June, 1921	286,549	336	1-853
		Jan.-June, 1919	2,147,925	3,460	1-600
		Jan.-June, 1920	1,802,988	2,797	1-600
		Jan.-June, 1921	1,662,174	1,718	1-967
Denver.....	Cattle and calves	July, 1920	26,654	2	1-13,327
		July, 1921	32,029	9	1-3,558
	Hogs	July, 1920	18,886	17	1-1,116
		July, 1921	24,785	16	1-1,549
	Sheep	July, 1920	70,803	26	1-2,728
		July, 1921	68,200	15	1-4,546
Chicago.....	Cattle and calves	June, 1920	297,468	539	1-552
		June, 1921	299,001	468	1-639
		Jan.-June, 1920	1,780,781	3,283	1-536
		Jan.-June, 1921	1,747,536	2,581	1-667
	Hogs	June, 1920	669,320	3,534	1-189
		June, 1921	674,945	1,713	1-394
		Jan.-June, 1920	3,921,556	13,206	1-297
		Jan.-June, 1921	4,143,399	10,425	1-397
		July, 1919	603,442	1,817	1-332
		July, 1920	584,220	1,067	1-547
		July, 1921	567,672	1,008	1-563
	Cattle and calves	June, 1920	113,915	108	1-1,054
		June, 1921	86,580	92	1-941
		Jan.-June, 1921	508,793	1,086	1-468
		Jan.-June, 1921	421,251	489	1-861
St. Louis.....	Hogs	June, 1920	241,696	582	1-409
		June, 1920	275,494	493	1-651
		Jan.-June, 1920	1,912,266	3,653	1-523
		Jan.-June, 1921	1,805,758	2,941	1-614
	Cattle and calves	June, 1920	88,928	130	1-684
		June, 1921	70,482	112	1-629
St. Paul.....	Cattle and calves	Jan.-June, 1920	546,303	1,077	1-507
		Jan.-June, 1921	425,713	626	1-680
	Hogs	June, 1920	203,890	1,086	1-187
		June, 1921	158,507	537	1-295
	Hogs	Jan.-June, 1920	1,308,476	4,446	1-294
		Jan.-June, 1921	1,198,864	3,229	1-371

TABLE 1.—LOSSES OF LIVESTOCK IN SHIPMENTS RECEIVED AT PRINCIPAL MARKETS—
CONTINUED

Market	Species	Period	Number Received	Num- ber Dead	Ratio
Kansas City.....	Cattle and calves	June, 1920	177,344	106	1-1,692
		June, 1921	153,578	58	1-2,648
		Jan.-June, 1920	93,658	686	1-1,364
		Jan.-June, 1921	124,159	388	1-2,382
	Hogs	June, 1920	205,919	468	1-439
		June, 1921	226,313	570	1-397
Jan.-June, 1920		1,491,812	2,796	1-534	
Jan.-June, 1921		1,331,743	3,028	1-436	
St. Joseph.....	Cattle and calves	June, 1920	52,472	13	1-4,036
		June, 1921	41,017	12	1-3,481
		Jan.-June, 1920	327,627	174	1-1,883
		Jan.-June, 1921	261,993	90	1-2,911
	Hogs	June, 1920	182,748	350	1-522
		June, 1921	188,270	268	1-702
Jan.-June, 1920		1,177,817	1,699	1-694	
Jan.-June, 1921		911,629	1,191	1-789	

The loss of hogs at South Omaha was considerably less in 1921 than in 1920. The same is true of Denver. The loss of cattle at Denver was greater in 1921 than in 1920, but it was a very small loss in both years. Chicago shows improvement in both cattle and hogs. St. Louis shows improvement in hogs in 1921 over 1920. There were more cattle lost there in June, 1921, than in June, 1920, but the six months' period shows an improvement in 1921 over 1920. St. Paul shows improvement in hogs, while the results for cattle are practically the same as at St. Louis. Kansas City shows improvement in cattle in 1921 over 1920, but the hog loss was greater in 1921 than in 1920. St. Joseph shows improvement straight through.

Table 2 shows improvement in the matter of hog loss at the eleven principal western markets. The death rate was 41 per cent less in 1921 than in 1920. Table 3 shows the ratio of loss in three species of food animals at these markets.

Some shipments of hogs are made by motor trucks. During July, 1921, at South Omaha 20,860 head of hogs were received in this manner. During June, 1921, 23,676 head were received

TABLE 2.—DECREASE IN LOSS OF HOGS AT ELEVEN PRINCIPAL WESTERN MARKETS

Items	June, 1920	June, 1921
Receipts.....	2,188,012	2,139,155
Dead.....	7,157	4,279
Ratio.....	1-304	1-499

TABLE 3.—RATIO OF LOSS IN THREE SPECIES OF FOOD ANIMALS AT ELEVEN PRINCIPAL WESTERN MARKETS

Species	Ratio, Dead to Received	
	June, 1920	June, 1921
Cattle.....	1 to 2,600	1 to 2,847
Cattle and calves.....	1 to 1,100	1 to 1,175
Sheep.....	1 to 1,600	1 to 1,949
Hogs.....	1 to 300	1 to 500

there in this manner. We have nothing to do with these shipments and keep no record over an extended period of time. During eleven days for which a record was kept the ratio of dead in truck shipments was one dead to every 614, compared to 1 to 853 in railroad shipments for practically the same period, showing that hogs will die in transportation when they never see a stock car. This has also been verified by investigation at other markets.

We now come to a subject which is rather bothersome to the railroads, and that is the matter of "overs" and "shorts" at markets. There is often a possibility of hogs becoming mixed when being unloaded from railroad cars. Sometimes the chute gate does not close tight against the side of the car, leaving a space of 16 to 24 inches through which small animals may escape. We strongly recommend to stockyard companies that they place an auxiliary slide gate in the chute that may be closed up tight against the side of the car. This need not be done at once, but in repairing the old gates as they wear out this slide could be put in.

The interlocking toe-board is very valuable and necessary apparatus, especially for the handling of horses and mules.

The greatest cause of loss in cattle shipments is thin condition of flesh. A much larger per cent of thin cattle die in transit than any others. Some cattle of this class are shown in figure 3. These cattle were a Texas shipment in the fall of 1917.

An explanation of the digestive apparatus of the ox will show why cattle shrink so greatly in transit. Two-thirds of the abdominal cavity is taken up with the first stomach, called the rumen or paunch. It is possible for this organ in a 1,000-pound animal to contain 180 to 265 pounds of undigested food. When the animal is kept in transit for some time this food will be digested and evacuated, and of course the amount that is di-

gested from this paunch decreases the animal's gross weight to that extent without the body tissues being drawn upon to sustain life. It follows that shrinkage in transit does not involve meat loss unless the animals are kept off of feed for many hours. Meat is what is being produced.

Cuts and bruises are other causes of loss of meat. Cattle are sometimes bruised and cut by the horns of other animals in the same car. Hogs are bruised by the use of whips, quirts and clubs in driving them. Great effort is being made to have all such implements of torture discarded by livestock handlers at our large market centers. The prod pole with a steel point surely belongs to the dark ages and should be discarded by all means, as every prick from a prod pole means a loss of meat, for the reason that injured portions must be removed and very often cuts of meat are spoiled thereby.



Fig. 3—Thin cattle, a class among which losses in shipment are heavy.

The modern method of driving hogs is by the use of the slap-jack. Hogs that are handled in that way come from the scraping and cleaning in the packing house in good condition and there is no loss or spoiled cuts of meat on account of bruises or injuries.

Mr. R. L. Carter, of Swift & Company, has compiled the following statistical information in regard to loss from bruised meat:

Beef Loss on Account of Bruises, Week Ending March 20, 1920

Cattle killed, 25 markets.....	46,789
Cattle bruised (26 per cent).....	12,059
Meat removed on account of bruises.....	15,933 pounds

Hog Loss on Account of Bruises During the Year 1919

Hogs killed, 53 markets.....	30,512,000
Estimated loss of meat per hog.....	One-half pound
Total loss of meat, 53 markets.....	15,256,000 pounds
Average live weight, Chicago.....	190 pounds
Average live cost, Chicago.....	\$17.85
Average dressed cost, Chicago.....	\$23.00
Total loss on account of bruises.....	\$3,508,880.00
Loss of meat equal to 80,295 hogs, or about 820 cars.	

Hog Loss on Account of Bruises, Week Ending March 30, 1920

Hogs killed, 37 markets.....	229,606
Total loss of meat per hog.....	One-half pound
Total loss of meat, 37 markets.....	114,803 pounds
Average live weight, Chicago.....	238 pounds
Average live cost, Chicago.....	\$15
Average dressed cost, Chicago.....	\$20
Total loss on account of bruises.....	\$23,860
Loss of meat equal to 501 hogs, or about 5 cars.	

COOPERATION BETWEEN VETERINARY AND HUMAN MEDICINE

The London correspondent of the *Journal of the American Medical Association* writes as follows:

"The value of cooperation between veterinary and human medicine has often been pointed out, and has recently been insisted on by Sir Clifford Allbutt, but has never been carried out. Mr. Scott, president of the Mid-West and South Wales Veterinary Medical Association, has drawn up the following proposals:

- (1) A veterinary officer should be attached to the medical department of the ministry of health.
- (2) A whole-time veterinary officer should be appointed in all large cities to work in conjunction with, but not subordinate to, the health officer.
- (3) In provincial towns a part-time veterinary officer should be appointed to work with the health officer on the same basis.
- (4) Research work in comparative medicine and pathology should be carried out in research institutes and universities open to researchers following human or comparative medicine.
- (5) The older universities should found chairs of comparative pathology.
- (6) The universities should grant degrees in veterinary science, and postgraduate courses should be arranged.
- (7) A list of diseases communicable from animals to man should be fully drawn up by physicians and veterinarians, and a closer study of these instituted, particularly prophylactic.
- (8) The medical and veterinary societies should hold joint meetings to exchange views on matters of mutual scientific import."

DUNCAN McEACHRAN AND THE MCGILL FACULTY OF COMPARATIVE MEDICINE¹

By VERANUS ALVA MOORE

*Dean, New York State Veterinary College at Cornell University,
Ithaca, New York*

IT IS IMPORTANT, among the exercises commemorating the achievements of a hundred years in a great university, that the influence exerted by one of its faculties, that no longer functions as a part of the institution, should not be forgotten. It often happens that a worthy undertaking is brought to an



Duncan McEachran, LL. D.,
F. R. C. V. S.

untimely end for want of vision or lack of support. Such was the case with the McGill faculty of comparative medicine and veterinary science. It was organized in advance of the time when the people recognized the economic and sanitary significance of animal diseases, and also before there was much definite knowledge concerning them. Under such circumstances, in an undeveloped country as this was at that time, it is not surprising that the true purpose of veterinary education was neither appreciated nor understood.

Dr. McEachran opened the Montreal Veterinary College in 1866 and directed its activities so long as his individual efforts and resources sufficed. When conditions changed educationally and adequate support failed, he had the courage to close its doors. A kind Providence has allotted him fourscore years in which to witness the fulfillment of his early prophesies and the

¹ An address given at a complimentary dinner to Dr. Duncan McEachran at the Ritz-Carleton Hotel, Montreal, Canada, October 18, 1921.

adoption of many of his ideas concerning veterinary education. It is a gracious act, at this centennial of the university to which he has been so loyal, for his former students to pay him this tribute in appreciation of his many and valuable services to them and for their cause. There could be no compliment more expressive of the high esteem with which he is held than this gathering of distinguished men from many States and Provinces. Likewise there could be no testimonial more acceptable to him than to be assured in this manner that his labors were appreciated and that his graduates have played a worthy part in the development of the veterinary profession on the American continent.

My duty, as I see it, is not to dwell on the personal achievements of Dr. McEachran, nor to picture the trials and discouragements that he met and overcame, nor to detail the attainments of his former students. All these are matters of record that the future historian will arrange in proper sequence for the coming generations. The task I should like to perform is to bring into bold relief the foundation ideas inaugurated by him and the results of the influence of his work, and that of the graduates of the institution he founded, on veterinary education of today; yea, of tomorrow as well.

In order to appreciate the value of McEachran's services to his profession and to understand why the school he founded exerted the lasting influence for good that it has, we must consider them in connection with the time and the environment in which they operated. Every cause that has succeeded in making the world better for human existence has had a long and trying struggle before the benefits sought have been attained. Likewise, the conception of veterinary medicine and the evolution of a profession to apply the principles of science for the relief of dumb creation and profit to animal industry has had a history that must be reckoned with in understanding the part taken by any man or institution that has contributed to its success.

In the development of veterinary medicine the same forces have operated that determined the growth of human medicine. The theories of the early writers to explain the nature of disease gradually became differentiated into a variety of doctrines, each having its advocates. In turn, these stimulated other thinkers to bring forth still more explanations. Individualism domi-

nated all there was in medicine. The success and subsequent failure of this system is illustrated in the work of Apsyrthus of Bithynia, the veterinarian of the Roman Army, who, in the third century, controlled glanders, recognized the sanitary significance of isolation and mechanical support in the treatment of fractures. As the reason for his successes was not explained, the advances he inaugurated disappeared with his death. A succession of distinguished leaders in the art of healing, each introducing new subject matter with a different explanation as to the cause of disease, tended to confuse and ultimately led to the founding, in the ninth century, of the University at Salerno, which was not only the first university but also the first medical school. Its purpose was to ascertain the truth in the theories set forth by individuals, to correlate all the facts into working hypotheses for their application and to provide methods for teaching the new subjects that were being introduced.

It is interesting to observe that nearly a thousand years later radical changes were called for in the educational system of our country to meet the requirements for its development. This found expression in the law establishing the Land Grant Colleges in the United States. A comparison of the arguments in favor of this law used by Senator Morrill with the reasons advanced for organizing the first university will show a most striking similarity between them. The purpose of each was to find a means by which the truths and principles in the existing knowledge could be determined and made available for the benefit of the people. It is from the Land Grant Colleges that most of the permanent veterinary schools in the United States have arisen. The others are associated, as in Canada, with large universities.

The achievements of the veterinarians in the earlier centuries availed but little in the revival of veterinary science after the Dark Ages. Even the prestige of the earlier schools seemed to have been lost and it was found necessary to begin again. There was the same need that there was in human medicine for trained men to care for the sick and injured. The situation appealed to one Claude Bourlegat, who organized, in 1761, the Veterinary College in Lyons, France. Then followed, in rapid succession, the establishment of numerous schools in many countries for the purpose of conserving the animals that were

being injured in war and lost from disease. While some progress was made in the improvement of methods for the application of existing knowledge, modern medicine, human and comparative, actually began with the work of Davaine, Virchow, Pasteur, Lister and a host of others working simultaneously and following them in the field of natural sciences. These men exposed the fallacies of the former conceptions and traditions of disease and established in their place the fundamental principle that diseases are the natural consequences of natural causes and that prevention is infinitely more important than treatment. This conception, which had been foretold with the conviction of revelation by many earlier workers, had its birth in the experimental method of study introduced by Pasteur and his co-workers.

The period of transition from the empiricism of the ancients to the acceptance of the idea that diseases should be studied and treated as objects of natural history was destined to be one of bitter controversy. It lasted for nearly a generation, and for all time it will require earnest, intelligent endeavor to maintain belief in the modern conception of the nature of disease and the new function it brought to the medical professions.

It was during the time that the specific nature of infectious diseases was being demonstrated, and the natural causes for the others were being determined, that veterinary education began on the American Continent. Prior to this a few unsuccessful efforts to establish veterinary colleges in the United States had been made. Practice was restricted to a few graduates from European schools and a much larger number of men of no preparation or technical training who believed they could in some way drive disease away. The rapid growth of animal industry, the increase in losses from disease due to the long occupancy of the soil, and the introduction of plagues through the indiscriminate importation of animals were signals not to be mistaken for a more efficient veterinary service.

At this time, when the tenets of the profession were being shaken to their very foundation, when old theories were being abandoned and a new knowledge was springing up, five young, ambitious veterinarians, trained in the best schools of Europe, came to America and undertook, each in his own way, to develop veterinary education in the land of his adoption.

They were Alexander Liautard, who came from France to practice in New York City in 1859, but soon assumed the responsibilities of conducting the New York College of Veterinary Surgeons; Andrew Smith, who came from Scotland to Toronto in 1861 and started the Ontario Veterinary College; Duncan McEachran, also from Scotland, who came to Woodstock, Ontario, in 1862, to practice his profession; James Law, a graduate of the Edinburgh Veterinary College, who was chosen professor of veterinary medicine and surgery in Cornell University in 1868; and Henry J. Detmers, who came to America from Germany the same year and entered educational work, first at the University of Illinois and later at the Ohio State University. These men, their students and the graduates of the institutions they founded, have determined the veterinary policies in our two countries.

It would be interesting and helpful to portray the success of each of these truly great men in carrying out his ideas relative to veterinary education and service. They and their students established not only the veterinary schools but also Federal and State organizations for protecting livestock from diseases that arise from within and scourges that otherwise would come from without. The progress they made was won by battling against ignorance, the objections to new theories for the prevention, control and treatment of animal diseases and the vigorous opposition to higher educational requirements for veterinary students. The outcome of the generation in which they lived has been to give these countries veterinary colleges with preliminary educational requirements and length of course that compare favorably with those of human medicine.

The growth of veterinary medicine in Canada and the United States has been so rapid, and those interested in it have become so numerous, that the work of these five great leaders will soon be overlooked by veterinary students because of the enormous volume of new subject matter which science is revealing and which is being organized to aid in making an efficient, working profession. It seems proper that we should reflect on the wonderful inheritance they left us in perseverance, scholarship and character. Fortunately, all of these men were blessed with good health and long life. However, of the five, "the reel of four has been wound" and the shuttles lie empty, but for the

fifth, our guest of honor, there are remaining other, and we hope many, threads to be added to the woof of his already long and useful life. His strenuous efforts for the benefit of his profession, especially in raising its standards educationally, are likely to be underestimated by those who pass judgment on the influence of a college that did work of a pioneer nature and which thrived for a time and then disappeared. In this connection it is well to remember the principle, underlying all great achievements, that "progress is made sometimes by retreats as well as by advances." He is a wise general who knows when to halt his troops in order that that which has been gained may not be lost.

In 1866 Dr. McEachran severed his relations at Woodstock and came to Montreal. At the suggestion of Sir William Dawson, Principal of the McGill University, Dr. George Campbell, Dean of the Medical Faculty, and Major Campbell, President of the Board of Agriculture of Lower Canada, he inaugurated a course of lectures in connection with the Medical Faculty of the University. The veterinary students were admitted with the medical students to all classes embraced in the veterinary curriculum. McEachran was appointed director and lecturer on veterinary medicine and surgery. From the inception of the school he set himself to the task of raising the educational standards of his profession. He was the life and soul of the school until he had taught those who became co-workers in this labor of love. At this time, when the British and American veterinary schools required no matriculation tests, McEachran inaugurated an entrance examination and insisted on a course of three sessions of six months each instead of two that were required in other veterinary schools. In human medicine two years only were required. Several distinguished men in the medical faculty cooperated in this work. Crask in chemistry, Fraser in physiology and pathology and Dawson in botany were among those who, in the early days, taught and inspired veterinary students. Thus began the third veterinary college on the continent and the second in Canada.

It was only those possessed of a prophetic vision who could understand the necessity for the exacting specifications of McEachran in organizing this new veterinary school. He understood then—as we all do now—that preliminary educational

training is essential on the part of the students to enable them to understand the more difficult technical subjects in a professional course. Again, he recognized that three years was a minimum time in which students could be disciplined in the subjects of the curriculum. It was this call to higher ideals in the profession, which foretold more efficient service, that appealed to the manhood and the intelligence of many young men who, I believe, would not have studied veterinary medicine without it. Measured by present criteria, the requirements demanded were small; but judged by the standards of fifty-five years ago, they were outstanding and conspicuous for the long step they took in advance. The prerequisites advocated and won by Law and Detmers many years later were no more progressive, because of the general educational attainments of the time, than were those insisted upon by McEachran in 1866.

At first the Montreal Veterinary College occupied rooms with the McGill Medical Faculty. Later McEachran, at his own expense, built the college on Union Avenue. In 1889, on the recommendation of the Faculty of Medicine, the Governors of McGill University created a Faculty of Comparative Medicine and Veterinary Science, and appointed him Dean and Professor of Veterinary Medicine and Surgery.

Although the Montreal Veterinary College, and later the Faculty of Comparative Medicine and Veterinary Science, was affiliated with McGill University, it did not receive financial support from that source. The Government finally gave the college a grant of \$1,800 annually, but beyond that it was supported by the fees of the students and the generosity of its Dean. The University, however, continued to give instruction to the veterinary students in such subjects as their curriculum called for that were being taught by the Medical Faculty. It was the inspiration engendered by such men as Osler, Adami, Mills and Wyatt Johnson, as well as by those who preceded them, that extended the reputation of the school. Men came to it not only from Canada, but from beyond her boundaries. They came to it, or went from it, to 26 States and Territories in the Union, as well as to Africa, Australia, Cuba, England, Hawaii, Ireland and the Philippine Islands. Of the approximately 312 graduates, 148 came from or went to the United States.

The high reputation of the McGill Veterinary College in

the United States was established through the excellent work of her graduates. They were leaders, whether among practitioners, those doing State livestock sanitary work, or teaching. In almost every group of men interested in these subjects, we find a McGill man. Such men as Pierce, Hinekley, the Miller brothers, Mulvey, McCracken and many others, imparted to their respective communities not only a conception of service but also one of dignity in the practice of veterinary medicine. These men have been very influential in stimulating educated young men to enter the profession. Lamb in Colorado carries the authority and influence he does because of his excellent work in State veterinary service. Higgins was a leader in laboratory work, and Blair is giving the world a great wealth of new knowledge on the intelligence of wild animals and their care in captivity. Ramsay is doing a work in the eradication of disease that will make him famous for all time. Among the teachers and research workers in veterinary medicine in the United States, Williams stands in the front rank. His results in the development of important surgical operations, especially the one for roaring, known by his name, has given him an international reputation as a surgeon. He was among the first in the study of the diseases of breeding cattle. His findings have done much to point the way to a successful method for the treatment and prevention of abortion and sterility in cattle. His treatise on this subject, which is just off the press, will be welcomed by the profession. Further, he is the author of the best text-book on veterinary obstetrics and also of the first series of exercises for laboratory instruction in practical veterinary surgery. I know of no teacher in this or other fields of veterinary science who has done more to simulate research and to bring the profession into its own than this distinguished alumnus of your Alma Mater. In Canada many responsible veterinary positions have been filled by McGill men.

The creation of the sciences, always a slow process, had reached a period of intensification. The last fifty years had been "the most prodigious period of change through which the world has ever passed." More progress had been made during this time than in the previous hundred centuries to solve the problem of human control of nature's forces. It was not strange, therefore, that the Dean, recognizing the advances that had

been made in the physical and biological sciences and the necessity for well-equipped laboratories and better facilities for teaching clinical medicine and for research, decided that if these could not be provided it would be better for the school to discontinue. He had a fitting realization of his duty to the students, to the alumni, to the profession generally and to the livestock industry of his country. He had spent lavishly of his personal funds, but with the rapid progress of the profession they were insufficient, and, failing in his efforts to obtain financial support for his faculty, he tendered his resignation in 1903 and the school was closed. The Board of Governors of McGill University appointed him professor emeritus and in 1909 honored him with the degree of Doctor of Laws.

Dr. McEachran is to be congratulated for his act which led to the closing of the school, much as at the time it embarrassed him, the University and the alumni. He believed the school should continue along the lines he had formulated to provide an adequate veterinary service to safeguard the animal husbandry of his country. He feared disaster to the industry if properly trained veterinarians were not available. It is a compliment to him that he saved the good name of the institution. With the inevitable development of the livestock industry of Canada, it is not unlikely that the University may be able to restore its Faculty of Comparative Medicine and to continue the important work so nobly started in 1866.

McEachran's interests in his profession were not limited to the school he founded. He assisted many undertakings where his technical knowledge was needed. He early became associated with the Government in connection with livestock sanitary work, in which he was most successful. It is difficult for us to appreciate the trials that beset those seeking the enactment of the first laws giving authority for the organization of livestock sanitary work. The people were living in a vast and beautiful country, abounding in animals and free from the plagues that staggered the Old World. The expanse of ocean between the old and the new countries seemed to give protection against the scourges abroad. However, McEachran saw that the increasing importation of purebred animals for breeding purposes would introduce, sooner or later, serious maladies if the country was not protected against them. In a letter to

the Minister of Agriculture, under date of September 28, 1875, published in *The Farming World*, he called attention to the fact that cattle plague, contagious pleuro-pneumonia, foot-and-mouth disease and sheep pox had been introduced into Great Britain by importing stock from infected districts on the Continent of Europe, and emphasized the necessity of protecting Canada against such invasions. The result of his efforts was the establishment at Fort Levis of a station for detention, with the consent of the owners, of imported animals. The value of this measure was recognized promptly and other stations were provided. In 1876 he organized "The Cattle Quarantine System of Canada" and for twenty-seven years was its executive head. It has been reported that it was the most successful and complete organization of its kind.

In 1879 he was sent by the Canadian Government to the United States to investigate the pleuro-pneumonia situation. His report led to important action by the Canadian Government to prevent the importation of that disease. The immunity Canada enjoyed from that scourge was due to regulations formulated on his recommendations. The arguments he advanced for a thorough quarantine are set forth very clearly in an article which he read at the thirteenth annual meeting of the United States Veterinary Medical Association and published in the first number of the *American Veterinary Review* (1877). I quote from the concluding paragraph. It may do us good to read what he wrote 45 years ago.

"In conclusion, gentlemen, I would suggest to this Association, that you should approach the Government and point out the necessity for preventative measures being adopted and urge upon them the importance of recognizing this profession, and ceasing to appoint uneducated men to positions of responsibility, while you have young men educated in science, both able and willing to fill the positions. Let our motto ever continue to be 'Vis Unita Fortior,' and instead of our noble science * * * being looked upon as scarcely respectable, we must and will stand side by side with all the other liberal professions. And I certainly do think that if we can bring about the objects of this paper we will do much to deserve the lasting thanks of this great people."

In the same volume there is a series of articles on veterinary education and its significance in the prosperity of our animal

industry, that both veterinary officials and teachers can still read with profit.

The influence of McEachran's work in Canada did much to aid Salmon in organizing the Bureau of Animal Industry in the United States Department of Agriculture in 1884 and in formulating regulations for the mutual protection of Canada and the United States in the interchange of livestock. It was through the efforts of these men that we have been safeguarded against the infectious diseases that are reported to have cost England alone more than \$400,000,000 during the first quarter of the nineteenth century.

In 1896 McEachran accompanied the Minister of Agriculture to Washington and assisted in arranging an agreement by which the quarantine between the two countries was virtually abolished. This opened the markets for mutual advantage to the livestock trade between the two countries. In 1897 he visited for the Canadian Government many of the European countries to study the situation in each relative to the existence and methods for the control of communicable livestock maladies. His report on this inquiry is worthy of careful study. In 1899 he represented Canada at the Seventh International Congress for the discussion of international livestock trade.

McEachran did much to enlighten the people on the prevention and control of animal diseases as well as to enforce preventive measures. He issued from time to time bulletins on the diagnosis and prevention of tuberculosis, sheep scab, glanders and other communicable diseases of sanitary and economic importance. He was interested in meat inspection and was among the first to recognize "deficiency" disease among animals. He was an unquestioned leader in livestock sanitation.

I am not unmindful of the criticisms that have been made on the shortcomings of the quarantine and other protective measures that were instituted in those early days. Undoubtedly there were many errors and omissions. In this connection, I am wondering if the veterinary teachers and officials of more recent times, or even of today, are meeting the professional obligations in safeguarding and bettering the animal husbandry of our two great countries with fewer mistakes and with more foresight than did the men of a half century ago. They were active in building up the efficiency of the practitioner as well as in exercising their

official duties in the enforcement of sanitary regulations. The technical knowledge now available is vastly greater than that which they had to guide them, but the purpose of the profession and the necessity of preparing and protecting practitioners are the same now as they were then. As one analyzes the problems they encountered, there comes a feeling that they recognized the complexity of the situation and guarded more cautiously every integral part of the composite service necessary to give protection to animal owners than is being done today. Veterinary efficiency means not only official protection against epizootics, but also a requisite number of trained practitioners to aid individual owners. It was the recognition of the value of the teacher, the practitioner and the official, and of the ethical relationship and interdependence among them, that made McEachran strong. We of today have much to learn from the work and teaching of McEachran, Law, Detmers and Salmon.

The activities of McEachran were not confined to veterinary medicine. He was instrumental in the development of cattle breeding in, and the exportation of cattle from, Canada. In 1881, in association with Senator Cochrane, he purchased and was general manager of a large ranch in southern Alberta, where they maintained a herd of some 12,000 cattle and several hundred horses. In 1883 he severed his relations with this ranch and established, with Sir John Walrond, the Walrond Cattle Ranch, consisting of over 37,000 acres of purchased land out of a lease of 300,000 acres in the Canadian Northwest. They started with some 12,000 cattle. In 1886 he began extensive horse breeding with a stock of 250 well-selected mares. He imported several high-class Clydesdale and Shire stallions. This was a valuable asset to the horse industry of Canada. He was a horseman of recognized ability. He often judged at the National Horse Shows, and he was the sole judge of Thoroughbred horses at the World's Columbian Exposition in Chicago in 1893.

At the time of the Boer War he exhibited his ability to meet difficult situations. Because of the nature of the country in South Africa, the British men and horses were having difficulty in overcoming the hardships involved. Lord Stratheona appealed to the Doctor, thinking Canada might furnish relief. McEachran recognized at once that the Alberta cowboys resembled the Boers in their mode of life and work, and that no bet-

ter horses could be found for the task than seasoned cow ponies. These are thoroughly trained saddle horses, accustomed to carry heavy loads, to rush up and down hills, to ford and swim streams and to find their food when turned loose. Men and horses were quickly assembled by the Doctor, who personally selected the horses. This scouting regiment was known as the "Stratheona Horse." A veterinary officer of the British Army in South Africa wrote that the "Northwest horses are the best in the world."

In 1906 McEachran was chosen by the Anaconda Copper Company to direct investigations relative to the effect on animals, in the Deer Lodge Valley, of the smoke from the Washoe Smelter in connection with the suit brought against the company by the farmers of the Valley and known as the Bliss case. To accomplish the desired results and to meet the situation fairly he secured the services of pathologists and veterinarians, among whom were Theobald Smith and Leonard Pearson. He provided a working laboratory and purchased for examination many animals in the Valley that were reported to be "smoked." Characteristic of the man, he provided facilities and material for a thorough study of the case. He never expected good results without adequate provision for them. So well did he do his work that the judge, in his decision, mentioned the basic value of the evidence brought out in this part of the testimony.

I well remember calling on the Doctor at his room in the hotel the evening after he had finished with the court. He said in a tremulous voice, "This is the last of my professional work." But it was not the last of his services. Later in the same year he purchased a large farm near Ormstown, Province of Quebec, where he devoted himself again to horse breeding and in maintaining a dairy. He has been a life-long admirer of the Clydesdales and Shires and has raised many beautiful animals for the market. He has now disposed of most of the farm, but retains his home there.

I have sketched but imperfectly the more pronounced features of the work of Dr. McEachran. Emphasis has been placed on the activities that illustrate best the character of the man. He has been a pioneer in practically every field of veterinary medicine and has always maintained the dignity of his profession. Few men indeed have contributed so much to establish

their profession, to obtain efficiency from its members, to broaden its field of usefulness and to direct all of its activities into a service for the protection of the animal husbandry of their country. While he possessed a love for the work of his choice, his interests and his sympathies have been wide and generous. You who have known him as a teacher understand better than I, better than any of his public acts can convey, the educational and ethical ideals for which he stood. We who know him and his work from without feel that he was ambitious to bring about an understanding of medicine in its best and broadest sense. We of today are but beginning to see the vision of a united medicine that in those early days shone so clearly before his eyes. There is no stronger evidence of his loyalty to his profession and his greatness as a man and a teacher than the sterling quality of the work that has been, and still is being, done by his graduates. We congratulate him and felicitate the University on the many valuable services he has rendered both to his profession and to his country.

Finally, Dr. McEachran, it remains for me, on behalf of the veterinarians in the United States, to extend to you their greetings and heartfelt congratulations on this occasion. We earnestly wish and hope that your years to come may be many and very pleasant. You have labored long and diligently as practitioner, teacher and official, that those who follow you may be better and more useful because you have lived. In all these you have been successful. You should be happy, as we believe you are, to know that your efforts have been productive of much good and that you have laid a foundation on which future generations may build. Now that the cares and the burdens of life are passing, I trust you realize as did the poet that

Age is opportunity no less than youth itself,
Though in another dress,
And as the evening twilight fades away
The sky is filled with stars invisible by day.

The French national veterinary colleges opened their new sessions in the fall of 1921 with the following enrollment of new students who were admitted on passing the required entrance examination: Alfort, 32; Lyons, 21; Toulouse, 20. Alfort reports 12 veterinarians taking a special post-graduate course in exotic veterinary medicine.

CLINICAL AND CASE REPORTS

(Practitioners and others are invited to contribute to this department reports of unusual and interesting cases which may be helpful to others in the profession.)

CHOREA IN DOGS AND A MONKEY

By W. J. RATIGAN

New Orleans, Louisiana

1. An Airedale, male, past three years of age. Dog habitually ate sticks, pieces of carpet, etc. History of pneumonia contracted at an eastern show; afterwards chorea affecting the antibrachial musculature on the right side. Choreia present over a year, quite troublesome, abated slightly during sleep.

Fecal examination showed tapeworm infestation. Treatment, one-half grain of arecoline per os. I see this dog occasionally in one of the parks. Has shown no evidence of twitching since, as the owner says, "he received the medicine that made him salivate."

2. Newfoundland puppy, male, ten months of age, experienced a bad attack of distemper en route to the United States. The only attempt at medication aboard ship was to give him some sour sirup that he seemed to be fond of. The dog when I saw him was greatly emaciated, temperature about 98, breath very fetid, stools bad, and with a beautiful case of chorea affecting the limbs on the right side of the body and extending into the muscles of the neck.

When this animal got along in convalescence I directed that he receive a tartar emetic preparation four times a day. He had been on sodium cacodylate; had received two ampoules of it (5 gr.). One morning, some time ago, his owner, a trained nurse, discovered that the muscular twitching had suddenly left. Regarding the tartar emetic, as I recall, the dog had been given about six granules. He received them for some time afterwards, on the grounds of "scientific procedure."

3. I was called to see a valuable Airedale matron about to deliver her first litter of puppies. (The owner was unnecessarily alarmed; the event was postponed to another day.) This female had a fairly well-marked twitching of the muscles of the right fore limb. I was told that this condition had been present

since the animal had gotten into the swimming pool in Audubon Park and received a chill. She gave birth to eight good puppies. Her case of chorea has left her.

Everyone carrying on a dog practice of any magnitude is fully aware of the flimsiness of the theories put forth concerning chorea. We are not alone. Physicians are up against it as well as veterinarians.

4. Another case, perhaps of some interest, comes to my mind. Early last spring I amputated the penis of a large specimen of one of the South American monkeys in the New Orleans Zoo. (I perform this operation after castration in these animals as the only positive way of eliminating self-abuse.) This animal was given 1,500 units of tetanus antitoxin the evening after the operation; he had been operated upon in the morning. The following day I was notified that something was the trouble with one of its arms. This monkey never has shown any improvement. It is a "twitcher" still.

RUPTURE OF THE UTERUS IN COWS

By JOHN P. TURNER

Washington, D. C.

Three cases of rupture of the uterus during parturition have come under the writer's observation recently, which may be of some interest in the study of prognosis in these cases.

1. A grade Holstein-Friesian cow, second calf, having difficulty in calving, was attended by a colleague of the writer, and after delivery was found to have a ruptured uterus. An unfavorable prognosis was made, but much to the veterinarian's surprise, the cow recovered and became profitable. The owner was advised by my colleague not to breed this cow. Contrary to advice, she was bred and recently calved without any assistance or unusual postpartum condition occurring.

2. Grade Holstein-Friesian heifer, two and one-half years old, had been in labor several hours and had been receiving assistance from the owner. Examination showed a posterior presentation, with flexion of the hind legs at the tarsus, the latter being caught in front of the pubis. Inasmuch as the buttocks of the fetus had been drawn into the pelvic cavity to a considerable degree, it was not possible to note whether or not any injury

had occurred to the cow. As repulsion was not practicable, both tarsal articulations were crushed with the osteotrite. After injecting a quart of petrolatum oil into vagina the calf was delivered without difficulty. The usual examination was made and a large tear was found in the side of the uterus, caused by the intense pressure of both hocks against the pubis. Owing to the length of time that the heifer had been in labor and the fact that the placenta was tightly adherent, together with a condition of decubitus, a fatal prognosis was made. The heifer died the following day.

3. Grade Holstein-Friesian cow in labor with second calf. Cow was in excellent condition. Had been in labor several hours and herdsman was unable to deliver the calf. Found conditions identical with case No. 2, save that the cow was on her feet. The calf was repelled and each hind foot was carefully brought into position, protecting the mother by the proper position of the operator's hand. After injecting a quart of petrolatum oil into the vagina the calf was delivered with but little effort. Examination revealed a large tear in the side of the uterus, permitting the hand to touch the rumen and small intestines. The placenta was easily removed without using any traction. Prognosis grave, but some hope was entertained owing to the excellent physical condition of the cow. She was made comfortable in a large parturition stall and after 24 hours ate a bran mash and some ensilage. Recovery was rather slow and some vaginal discharge persisted for a month. The cow was not treated in any manner, save some stimulants for two or three days. Within two months she had regained her condition and became a profitable milk cow.

When she came in estrum about four months later, vaginal and rectal examination showed the vagina and uterus to be so nearly normal that she was bred and is now pregnant.

Procaine is the American name for the older German product which was known by the name novocaine. This German novocaine was never made in this country and is not made in this country now. The word novocaine is used today by one of the three manufacturers of procaine as its trade name. The American made product, procaine, is the equal if not the superior of the original foreign made drug.—*H. E. Tompkins in New York Medical Journal.*

ABSTRACTS

THE BASIS OF NON-SPECIFIC IMMUNIZATION. E. F. Mueller.
Deut. Tierarztl. Wehnschr., vol. 29 (1921), p. 513.

There is no drug capable of destroying bacteria that have invaded an organism. This must be accomplished by the organism itself through its defensive reactions, initiated by the bone marrow. Recovery from an infection will depend not alone upon the extent of the defensive reactions, but also upon the speed with which they are mobilized. Early treatment is very desirable. Irritating or toxic substances are not suitable for non-specific treatment, for although they might stimulate strong defensive reactions, the newly released energy for defense might be entirely consumed in the elimination of the toxic material injected. The injection of turpentine produces a marked increase in leucocytes, but these are not therapeutically effective because they are used up in eliminating the turpentine. Desirable therapeutic agents stimulate the defensive organs powerfully without requiring much energy for their elimination. Substances that cause fever are not desirable in non-specific treatment.

Specific agglutinins may be increased by non-specific treatment. Thus in an animal immune to *B. typhosus*, whose serum diluted 1:3000 will agglutinate *B. typhosus*; the non-specific treatment will raise the agglutination titer. This is one of the best proofs that the material injected does not directly influence the disease process: it can do this only in so far as the remedy injected can stimulate the defensive powers of the invaded organism.

The basis of non-specific treatment lies in the animal and its available defenses.

W. N. BERG.

DESTINATION OF AVIAN TUBERCLE BACILLI IN THE BODY OF THE WHITE RAT. Y. Watanabe. Jour. of Bact., 1921, No. 309.
Abs. in Japan Med. World, vol. 1 (1921), p. 20.

In his previous work the author experimented on the natural immunization of the white rat against bovine tubercle bacilli. In the present communication he deals with the resistance of the white rat against avian tubercle bacilli. He injected 1/50th milligram of a slightly virulent avian tubercle culture into the

peritoneal cavity of a white rat, and the peritoneal juice was then collected by means of glass tubes. With this material, he tried to cultivate the organism. He examined the kinds of cells produced in the peritoneal juice and also the power of the phagocytosis. The experimental animal was then killed after a certain interval and its great omentum, mesentery, spleen, liver, lungs, kidneys and lymphatic glands were examined. A similar experiment was made by injecting the bacilli into the vein and also under the skin. By reviewing the results he obtained the following conclusions:

When 1/50th milligram of avian tubercle bacilli was injected into the peritoneal cavity of a white rat, a greater part of the injected bacilli was taken up by the intraperitoneal cells in 5 minutes as in the human tubercle bacilli and in 24 hours no bacilli remained free in the cavity. The phagocytosis was chiefly effected by the hyaline small mononuclear cells and large mononuclear cells, or in other words, macrophages. A part of the injected bacilli reaches the mesentery, where they form nodules, which usually begin to disappear from the 24th day, some nodules leaving traces after the disappearance. All the remaining bacilli penetrate into the great omentum, where they completely disappear. Human tubercle bacilli take about 100 days to effect it, while avian tubercle bacilli take about 40 days.

When the bacilli are injected under the skin they enter the cell body in the injected locality, rarely enter the lymphatic system lying near the injected site, and make a swelling there. The bacilli which enter either the cells or the lymphatic system disappear soon. These phenomena are the same as in the human tubercle bacilli.

If they are injected into the vein, they are carried on into the lymphatic system, the lungs and other viscera, but all of them sooner or later disappear. In the lungs they are found for a much longer period than in any other viscus, while the formation of nodules is more prominent in the lung than in any other organ.

In the previous work, which was made with bovine and human tubercle bacilli, the author concluded that if the white rat is naturally immune against tuberculosis, the cause of this natural immunization is nothing other than the constant phagocytosis that is carried on by the living cells, especially the large mononuclear phagocytes, endothelial cells and the cells in the

nodules of the lymphatic glands, and the natural defence against the injected tubercle bacilli is complete only when they are made to pass through the endothereal cellular tissues or through the lymphatic nodules. From the results he obtained with the avian type of tubercle bacilli, he concludes that his former conclusion as to the natural immunization of the white rat against tubercle bacilli has been further confirmed.

ETIOLOGY AND PROPHYLAXIS OF LUMBAR PARALYSIS OF SHEEP.

Tsuruma Ito. Jour. Cent. Vet. Soc., vol. XXXIV (1921), No. 4. Abs. in Japan Med. World, vol. 1 (1921), p. 19.

The author carefully examined the feces of the sheep suffering from the disease, which prevailed in Formosa, and found almost without exception the eggs of anguillula. From this fact, he conjectures that the disease must be due to the transmigration of the larvæ of anguillula into the subarachnoid spaces. If this be true, the prophylaxis of the disease seems very simple, for it will require only the prevention of the infection from anguillula.

FURTHER NOTES ON THE ETIOLOGY AND PROPHYLAXIS OF LUMBAR PARALYSIS OF SHEEP. Tsuruma Ito. Jour. Cent. Vet. Soc., vol. XXXIV (1921), No. 5. Abs. ibidem.

The author gives a supplementary note on his previous work which is referred to above. He tested microscopically the central nervous system of sheep dead of lumbar paralysis and found in the subarachnoid spaces and the spinal cavity a number of the larvæ of anguillula, while from the intestinal mucous membrane he recovered anguillula, which is most probably *Anguillula intestinales*. Thus he affirmed his former supposition.

A DIAGNOSTIC TUBERCULIN. E. Moro. Münch. Med. Wochenschr., vol. 6 (1920), p. 1524. Abs. in Amer. Rev. of Tuberc., vol. 5 (1921), p. 187.

In doing routine diagnostic tuberculin tests in his clinic, Moro noticed a sudden falling off of the number of positive reactions. On checking up this phenomenon by the use of five different makes of tuberculin, he found that while some products gave strong reactions, others gave either very weak ones or none at all

on the same individual. All these products were presumably of standard strength, as they had been stamped "government tested," but investigation showed that this test consisted in the injection of a given amount of the product in question into a tuberculous guinea-pig. If the pig died within twenty-four hours the tuberculin was approved and put on the market. Substances like *cutine* must be present in a tuberculin in order that it may give reactions in the human skin. Therefore a clinical test is also necessary before the product is put on the market for diagnostic purposes. Experiment showed that cultures with the most prolific growth yielded the most potent tuberculin, and further, that a partial concentration of the old tuberculin increased its reactivity. Moreover, some children with pure bovine infections would react to bovituberculin only, and others with pure bovine infections reacted to tuberculin of human origin only; but owing to the far greater preponderance of bovine infections the human tuberculin was of greatest value. The author then devised a tuberculin the composition of which he summarized as being "old tuberculin, made from selected stock cultures, partially concentrated, containing a certain proportion of bovituberculin, and strongly enriched with cutine." This product he has used for some months with entire satisfaction.

SWINE ERYSIPELAS AND ERYSIPELOID (IN MAN). G. Düttmann. Beitr. Klin. Chirurg., Tübingen, vol. 123, p. 461. 1921. (Abs. in Jour. Amer. Med. Assoc., vol. 77, p. 1455, Oct. 29, 1921.)

Düttmann has observed 8 cases recently which he is convinced were instances of rotlauf in man. The source of infection from a pig with the disease was known in three of the cases, but in the others there was no suspicion of the origin of the symptoms in the patient, and erysipeloid had been the label. In his cases as also in four reported by Schmidt in the following article, recovery was complete in from one to three days under serotherapy.

Professor of Chemistry: "If anything should go wrong in this experiment, we and the laboratory with us might be blown sky high. Come closer, gentlemen, so that you may be better able to follow me."—*Journal of the American Medical Association.*

REVIEW

DISEASES OF THE SMALL DOMESTIC ANIMALS. By Oscar Victor Brumley, V. S., Professor of Veterinary Surgery and Director of Clinics, College of Veterinary Medicine, Ohio State University, Columbus, Ohio. Published by Lea and Febiger, Philadelphia, 1921. Price \$4.75.

There is a comparatively limited number of up-to-date scientific works available which treat of diseased conditions in the small domestic animals. This publication, which gives consideration to diseases, both medical and surgical, of the dog, cat, and domesticated birds, is for this reason almost certain of meeting with sincere appreciation, but there are other and more important reasons why it will be highly esteemed by the veterinary student and busy practitioner for whom it has been prepared.

It is sufficiently comprehensive to include practically all abnormal conditions with which the practitioner may come in contact and furnishes descriptions of them that are clear, concise and to the point. The admirable arrangement of the contents is furthermore a feature that promptly attracts attention and testifies to the author's wide experience in the presentation of the subject to students. Despite the announcement that originality is not claimed for all the material in the book, it is recognized that the information it imparts is based to a great degree upon personal experience, and moreover upon an experience sufficiently broad to engender confidence in the minds of readers as to its authenticity.

The work is divided into fourteen parts bearing the following headings: Part I, Diseases of the Respiratory System; Part II, Diseases of the Circulatory System; Part III, Diseases of the Digestive Tract; Part IV, Diseases of the Reproductive Organs; Part V, Diseases of the Blood and Blood Producing Organs; Part VI, Diseases of Metabolism; Part VII, Diseases of the Organs of Locomotion; Part VIII, Diseases of the Urinary System; Part IX, Diseases of the Nervous System; Part X, Diseases of the Skin; Part XI, Diseases of the Ear; Part XII, Diseases of the Eye; Part XIII, Hernia; Part XIV, Infectious Diseases.

The parts enumerated are subdivided into chapters, a chapter usually being devoted to a discussion of the abnormal conditions that may involve a particular organ or area. One entire chapter of Part III gives consideration to intestinal parasites.

Infectious diseases, which constitute Part XIV, are classified in such a manner as to comprise five chapters bearing the following captions: Acute General Infectious Diseases; Acute Infectious Diseases with Localization in Certain Organs; Infectious Diseases with Special Involvement of the Nervous System; Chronic Infectious Diseases, and Infectious Diseases Produced by Protozoa.

A large proportion of the 57 chapters comprising the subject matter includes a description of a systematic means of diagnosis with reference to the organ or part considered, a feature recognized as highly advantageous.

The surgical procedures described are not entirely confined to those indicated for the alleviation of diseased conditions, but include also discussions of the technic employed in castrations and oöphorectomies of the different species of small animals.

The work consists of 636 pages exclusive of index. It is a decidedly compact volume, being especially adaptable to student needs in this respect. Practitioners will find it exceedingly helpful as a reference volume inasmuch as it gives consideration to methods of prevention and treatment of disease that are in harmony with present day knowledge.

J. M. B.

AN ITALIAN VETERINARY ANNUAL

An interesting and valuable Italian Veterinary Annual for 1921 has been issued under the editorship of Prof. A. Bartolucci of the Serotherapeutic Institute of Milan. Besides information and data that are undoubtedly useful to the veterinarians of Italy it contains much that is of general interest. Italy has nine veterinary schools, two of which are attached to universities. The degree conferred on graduates is "Doctor in Zootiatry." The register of veterinarians in Italy contains 2,546 names. The Army Veterinary Service comprises 2 colonels, 10 lieutenant colonels, 26 majors, 86 captains and 64 lieutenants. These figures, however, are slightly in excess of the numbers provided for by the new law. Italian veterinary journals consist of two weeklies, two fortnightly publications and three monthlies.

ARMY VETERINARY SERVICE

ARMY HORSES AND THE ARMY REMOUNT SERVICE

By FREDERIC M. PERRY

Framingham, Mass.

OUR Army Remount Service, like our entire reduced American Army, seems to wax and wane through the years according to the size of the appropriation allotted, both, in fact, seeming to be treated somewhat as footballs by Congress and people alike.

But regardless of the advent of the motor vehicle, including the tractor, our Army, as every other army, must have public animals, if men and "material" are to be moved at will over all kinds of terrain and in all weathers. It was largely due to the comparatively short distance between our ports and those in the European war zone that our great country furnished the bulk of the horses and mules to the Allies during the World War. It must be conceded that while our mules are the finest big mules in the world, and our heavy horses are of high average, the amount of horse stock really fit for the mounted service is exceedingly small, so small as to be almost negligible. In fact, it is said that we now possess in the entire country barely enough horses of true riding type and quality on which to mount a regiment. Of course we all know what has brought this condition about, thus causing our Army to be very poorly horsed, certainly so for the past 15 years at least; though the writer can easily remember when the average troop horse was a very sturdy, nicely turned and handy animal, having some quality withal. With the decline in the quality of animals furnished the mounted service, there has been corresponding lowering of average quality in equitation. All of which is to be keenly regretted by the horse lover and those favoring the field artillery or the mounted arm. The case is not helped any when every practical horseman knows that America, all the Americas in fact, are eminently adapted for the raising of high-class, quality horses, and that the laws of correct breeding are now well known on this Western Hemisphere. Some of the best equine blood of the world has been taken to South America, notably to the Argentine Republic, her breeders paying at public auction with lavish hand, and

many of the descendants of the early progenitors there were drawn into the World War and found their way to the land of their sires.

For many years the Argentine has been most partial to running races on the flat. There is only one breed that can produce successful candidates for that liveliest of all sports, namely, the English Thoroughbred; and to this breed we owe the peculiar ability to give to its produce the best backs, withers and shoulders suited to the riding horse.

While overseas the writer chanced to visit several of the French Army remount depots, and in each instance was shown the various classes of horses by the chief veterinary officer. Those from the Argentine interested me the most of all, for they approached the nearest in type to the requirements of the Army remount. There were received, seemingly, two general classes of horses from that country. One averaged slightly under 15 hands in height, but of that much-desired conformation adapted for saddle work; strong, straight backs, sweeping up into moderately high withers and well-sprung ribs, offering just the place to lay a saddle, and where it would most likely stay; nicely sloping shoulders and unusually good heads. "No foot, no horse," of course, but so good to look upon were the parts above mentioned, and which are now so seldom seen in the average animal offered at our great horse markets, that aside from the legs being well placed under, the details of legs and feet are now hazy in mind; while the lines of backs, withers, shoulders and heads are stamped indelibly upon the memory. So good indeed were these little Argentines that, conformation alone considered, many of them would have made polo prospects. A larger class of horses from the same country were shown weighing around 1,100 to 1,150 pounds, used for ambulance and transport work; without as much quality as the other, perhaps, yet very excellent animals and much like our highest class express horses. This matter of skeletal formation, anatomically correct, mechanically perfect, if you please, is dwelt upon at length because of its prime importance to the animal required to carry weight and at speed.

A span of proper type and length, upheld by four columns of great tensile and supporting strength, properly placed and each resting upon its hard, yet resilient pedestal, the hoof. Out in the range cattle country one frequently hears this or that horse referred to as a good "cutting horse" in distinction from others;

and almost invariably we find the animal to have just those desired points of skeletal structure here considered, and the whole clothed with hard muscle, massed at the right places, haunch, thigh, back and shoulder, and all driven by a highly developed brain and central nervous system giving him a quick eye, unerring judgment and instant action. His very build, along with the large, well-placed hocks, heavily muscled quarters and back and developed shoulder, allows him to possess that power of first importance in the saddle horse, called balance, enabling him to play his role as acrobat or first-class equilibrist in carrying his extra human load. If his rider also develops and holds this valued thing called balance, then there is unison of team play and accord of even more than smoothness of mechanical perfection. And while our "cutting horse" has received since colthood the A-B-C's of Nature's own supplying exercises, through his strenuous life on the range, the polo horse, stable raised, must acquire through a long course of training this art of balance at speed, of withstanding shock of stop and turn, for the work of both is similar. And the soldier's horse, the Army horse, like the cutting horse and the polo horse, requires much the same power in build and ability to play his appointed role of troop horse or charger. Such, properly bitted, trained and ridden, does not easily tire, wears well, and is therefore the efficient animal.

In these same remount depots many United States and Canadian horses gave abundant opportunity to make comparisons; and some one has fitly said, "Comparisons are odious." The veterinary officers explained also that the Argentine horses would come away through on a thirty or thirty-two-day voyage, in many instances without the loss of a single animal, or at most a loss of one or two per shipment; landing in nice, smooth, thrifty condition, practically without a case of influenza or shipping fever. Their appearance certainly supported this seemingly wild statement. Contrast this with the condition of many of our horses and mules consigned to the French Army with widespread infection and losses per shipment on voyage of only 12 to 15 days reaching in some cases as high as 10 to 12 per cent. Of course there is much to be said in explanation of this wide difference in the physical condition of the animals of the two Americas and its contributing causes.

To digress a moment—was not infection in the United States animals superinduced by such as the following factors: Bought

by contractors off of farm or range at an altitude anywhere from 500 to 2,000 feet above sea level, rushed to shipping points and to stock pens, corrals and stock cars, all more or less loaded with infective matter, including ramps, feed and water troughs, etc.; unloaded at Army purchasing centers, only to proceed later perhaps a thousand miles down to the seaboard; subjected to varying temperatures and surroundings, inviting infection at every stage?

Contrast this with conditions obtaining in our neighbor to the south of us. The bulk of the livestock of the Argentine is bred and raised at a low altitude. From personal observation there some years ago, one may walk right out of several of the seaport or riverport cities—Bahia Blanca, Buenos Aires, San Nicolas or Rosario—and come at once into the open agricultural country, resembling that of our own central West, making it therefore possible in many places to drive animals direct from estancia to steamer's side, or at most, with short rail haul. Did not these last-named conditions help in avoiding the dangers of infection?

There may be still another contributing factor. The greater number of horses seen at our principal horse markets throughout the country today carry a large proportion of draft blood, tending toward the cold, phlegmatic type, indicating low resistance and "weak" mucous membranes; while the type of South American horse herein referred to seemed to show a large infusion of warm or Thoroughbred blood, giving a denser bone, a firmer muscle and more highly developed central nervous system. Might not also these latter qualities also be accompanied by a high power of resistance to infection?

Without meaning to stress unduly the great merit of Thoroughbred blood as the only blood for our Army remounts, we are, nevertheless, confronted by some very stubborn facts in the case. The Thoroughbred has made the running race-horse what he is, the Irish hunter what he is, and the polo horse—the horse said to combine more power and high qualities in actual performance wrapped up in one animal than in any equine living today—this wonderful blood has made him what he is. But beyond all this again we must make our lowest bow of veneration to the Arab, the desert horse, that long ago made the Thoroughbred what he is. Preeminent in endurance, courage, docility and

intelligence—all indispensable fundamentals of the military horse and for the upbuilding of our Army remounts—the Arab lacks only in number to permit the fullest flow of this richest ancient blood to the light horse stock of the country.

Much to be regretted is the fact that the vast majority of the Thoroughbreds either raised in or imported to this country have been of the extreme racing type, possessing few other traits to attract the average horse lover, whence the false impressions of the breed and the prevailing prejudice against it. However, all breeders of the Thoroughbred in America did not seek for this extreme greyhound type; notably so the late J. C. Haggin of California and Kentucky, where on his estates were produced crop after crop of Thoroughbreds, superb animals of great substance, body and bone and with unusual docility, the sort that "fills the eye" and made it more than pleasure to view them at short range. Thus proving that this breed of desired type and quality can be raised here if demanded, and that it is, as also the Arab, essentially the same here as in South America, Australia or throughout Europe; proving further the recent contention of the eugenist, ethnologist and zoologist that breed is stronger than environment. And while our Remount Service is also using American Saddle Horse, Morgan and Standardbred blood—breeds of our own American origin and all having high merit—special emphasis seems recently to have been placed upon the Thoroughbred and Arab, the blood that gives the propensity to run, the galloping horse.

Though little has been proven, taken by itself, is it not, however, significant that of all the breeds competing in the long-distance endurance race of 300 miles, open to all comers and held for the past three seasons, instituted by the Army and the American Remount Association, the winners in each contest and the horses that really endured were horses carrying large infusions of either Thoroughbred or Arab blood close-ups? While the American Trotter or Standardbred is not altogether just the type we might choose to produce the military horse, being a trifle too long in the back, a little low in the withers, straight in the shoulder, and with inborn tendency to trot, still he is a warm-blooded race-horse, intelligent and tractable; his breed is widely disseminated throughout the country, being the most available for foundation stock of all our strictly American

breeds; moreover, certain strains and families, such as Mambrino King and his get, have even been famous show horses. The insistent commercial demand will doubtless continue to regulate the supply of the draft horse, the heavy horse, without artificial stimulus; but the present optimistic view of the members of our Remount Service toward obtaining from the farms of the country suitable light remounts for the Army seems to the writer, with the many facts before us, practically unjustified. Principally because the light horse, the riding horse breeding proposed and already projected and largely to be done by farmers, would produce an animal, even though up to 1,100 weight, that would be almost useless to the American farmer today, and the culls or "rejects" from our Army purchasing boards would be nearly unsalable and a distinct loss to the breeders and without commercial incentive, how shall the farmer breeder be induced to grow and offer suitable remounts to the Army? One earnest military member has suggested that the way out is for the Army to breed and raise all of its own remounts according to its own standards and specifications, the Government to take its loss in the public sale of its "rejects." Factors of cost aside, this method would have one outstanding virtue, practically to insure the production of the much-desired "specification horse," which up to now few of us have ever seen in American military service.

Is it any cause for pride to know that nearly every other country, little and great, furnishes its Army with animals superior to those of our own? Is it pleasant to know that it is officially reported that the mounted drill, the mounted work at the R. O. T. C. and civilian military training camps held in one of our Pacific Coast States the past summer could not be effectively carried out owing to inability to obtain sufficient suitable saddle animals for the purpose? And this in our great country, with immense pastures, abundant forage, suitable climate and foundation stock, and with thousands of our people skilled in the breeder's art. The lines of correct horse-breeding for military purposes are now clearly and definitely marked, and the blood preeminently suited to make the blend with American female stock thoroughly well known to those trained and experienced in this combined science and art.

Any veterinarian who has seen military service knows full

well that a commanding officer (line) of a post or camp cares little for even the most astute logistics of diagnosis or of treatment, representing the last word in niceties of surgical interference or medication. He wants as few animals as possible on the sick lines, on sick report, from any cause. In a word, he is chiefly interested in being furnished as good animals, class and type, as the Government will pay for, and that such animals shall receive such care as will maintain high health and efficiency.

Animals of various classes and types must therefore be selected, bought, shipped to depots, together with forage, etc., an enlisted personnel selected and trained to assist in their care, and happily, under our present military policy the breeding and raising of Army remounts has now also been included. But should not just such duties and responsibilities, from their inception, breeding included, fall strictly within the province of the Veterinary Corps? And shall we merit the term "animal engineers" given us by one whose name we will revere, if we meekly permit laymen to shoulder one whole department of our engineering for us? What inducement to enter the military service shall we hold out to the young aspirant to the veterinary degree, if he learns that upon accepting such a service he will quite likely report to, be commanded and perhaps always out-ranked by officers of another corps, in most cases untrained in his special field?

To be sure, our friends of the Quartermaster Corps may retort that veterinarians are untrained and ill adapted to handle big business in a big way; but in reply we point to the work of the United States Bureau of Animal Industry, now extended nation wide and performed and supervised almost entirely by veterinarians. For one, I have not only bought and shipped commercial classes of horses and mules for clients but have always broken and educated my own colts and horses, from initial work on the longe, biting and saddling to their complete education, conditioning them, selecting the forage, etc. If there is one there are hundreds of American veterinarians who have done or can do the same thing, all of which processes are of the character of remount work done in miniature, to be sure. Yet do such men need to go to school to the Quartermaster Corps to learn animal management?

It is an axiom of commercial life that correct means, methods, processes once discovered or devised, their duplication and application to quantity production becomes largely a matter of mechanics and arithmetic. At Camp Johnston, Florida, during the war, young officers of the Quartermaster Corps, in training, were being taught how to care for public animals at sea, a duty it is doubtful they would ever be called upon to do as long as an officer of the Veterinary Corps, a farrier sergeant or stable sergeant could stand on his feet. Why this needless duplication and overlapping of services?

A British Army officer overseas, watching one of our veterinary mobile sections passing, is said to have remarked: "The American Army Veterinary Corps is forty years behind the times." The Britisher was unaware that when he spoke the Corps was only one year old.

If we are to attract to the veterinary profession first-class timber, has not the time already arrived to make every effort to widen and deepen our field of endeavor in every legitimate way, advance our Army Veterinary Corps forty years *ahead* of the times if need be, to the end that greater service can be rendered our common country by maintenance of an improved horse supply, and so, as animal engineers in fact, do our tiny bit to make the United States Army the army of highest quality that it now aims to be?

MAJOR AND MRS. PICK ENTERTAIN AT CAMP TRAVIS

Major and Mrs. W. R. Pick, of 2d Division, Camp Travis, Texas, entertained the veterinarians of Fort Sam Houston and their wives and the Camp in a most unique manner, November 28, as an appropriate termination to the horse show.

After the guests assembled, twenty original comedians haying horsey terms for answers were puzzled over. Lieut. Reynolds and Lieut. Buffin tied the score for gentlemen's prize, and Mrs. Hodge won ladies' prize.

Each guest responded with a two minutes' performance, which resulted in a great exhibition of talent. The program consisted of original poems, caricature drawings, recitations and readings, interspersed with music, which was greatly enjoyed by all. The

winners were decided by ballot. Mrs. Reynolds, Mrs. Miner, Capt. Hodge and Lieut. Reynolds won prizes. A salad course was served.

Those present were Col. and Mrs. Lusk, Capt. and Mrs. Hodge, Capt. and Mrs. Eagan, Lieut. and Mrs. Buffin, Lieut. and Mrs. Reynolds, Lieut. and Mrs. Miner, Lieut. and Mrs. Rife, Lieut. and Mrs. Dildine, Lieut. Pickering, Lieut. Seymour, Major and Mrs. Pick and Misses Victoria and Sara Pick.

The Belgian Government has issued a decree prohibiting the exportation of Belgian draft mares and fillies of the age of 18 months or more, also of stallions of this breed which have been awarded certain premiums or bounties. Such stallions may be sold only to Belgians established in Belgium. Other horses may be exported under conditions prescribed in the decree.

A memorial tablet to Belgian veterinary students and veterinarians who lost their lives in the war, was recently placed in the Belgian Government Veterinary School with appropriate ceremonies which were participated in by Baron Ruzette, Minister of Agriculture; Colonel Migeotte, Chief Veterinarian of the Army; Dr. Gratias, director of the school; members of the faculty, graduates and students. The names of the honored dead were listed in three categories—(1) students killed at the front. (2) veterinarians killed in the Army service, and (3) "civilian veterinarians shot."

Dr. J. W. DeMilly resigned as State Veterinarian of Florida on January 16 to accept a position with the Lederle Antitoxin Laboratories of New York. Dr. DeMilly will be succeeded by Dr. J. V. Knapp, who has been a member of the Bureau of Animal Industry since April 7, 1913, and for the past seven years has been engaged in tick-eradication work in Georgia and Florida. Dr. Knapp is thoroughly familiar with the livestock conditions in the South and is well qualified for the position of State Veterinarian. *THE JOURNAL* extends to both Dr. DeMilly and Dr. Knapp its sincere wishes for their success.

A New York peddler has just bought a horse with a wooden leg. We fancy it must be the one we put our money on in the two-thirty the other day.—*London Punch*.

ASSOCIATION NEWS

AMERICAN VETERINARY MEDICAL ASSOCIATION

Proceedings of Fifty-Eighth Annual Meeting, Denver, Colo.,
September 5 to 9, 1921

(Continued from the January JOURNAL)

TUESDAY MORNING, SEPTEMBER 6, 1921

JOINT MEETING OF SECTIONS

The combined session of the sections on General Practice, Sanitary Science and Police, and Education and Research convened at 10 o'clock a. m., Dr. H. W. Jakeman presiding.

CHAIRMAN'S ADDRESS

Dr. Jakeman presented an address as Chairman of the Section on Sanitary Science and Police, as follows:

In accordance with a precedent established in the various sections of our Association, I have been placed on the program as chairman of this section for an opening address. While endeavoring to think of a suitable subject for the occasion it occurred to me that some benefit might be derived from the expression of a few thoughts concerning the future of our profession. The subject is one, of course, of paramount importance to all veterinarians, but it appears to me that livestock sanitary control officials in their diversified fields are most vitally and fundamentally associated with the task of molding the future of the veterinary profession, and that the subject is therefore an appropriate one for discussion before this section. Representing a progressive type of the profession, constantly before the public eye as Federal or State officials, and by virtue of the scope and nature of their professional activities, livestock sanitary control officials are carrying a great responsibility to the veterinary profession, and they can not rest on laurels of professional achievements but must give due consideration to the problems confronting the future of the profession.

I trust that the remarks I have to make will not be misconstrued nor considered of a pessimistic nature. They are offered as constructive criticism or food for thought, and are not intended to reflect on the progress or efforts of the past nor on the loyal and staunch supporters who have borne much of the burden of progress.

The veterinary profession has been and is going through a transitional or readjustment period, a period critical to the future status of the profession and one which is causing many to ponder over the outlook. We often hear such questions as: What standing will the veterinarian eventually occupy in the realm of science or the learned professions? What effect will the present low student enrollment in our colleges have in the immediate future? How are various farmers' organizations going to affect the future of the veterinarian? These and many more similar questions so often heard signify an existing element of doubt in the minds of many as to the future of the profession. It appears to me that the time is at hand when all doubt or uncertainty should be set aside and a greater, more con-

centrated effort made to overcome the conditions which are delaying progress and which are responsible for this feeling of uncertainty.

While many are too much inclined to see and resign to the uncertainty of the future, there are, on the other hand, too many thoroughly convinced that with the numerous possibilities for developing new and old fields of endeavor, the increased value of livestock and the higher entrance requirements of our schools, together with the extended time necessary to complete a course in veterinary medicine, the future of the profession is assured. Optimism is essential and is well warranted, for the basic structure of the profession has been well laid and advancement has been rapid; but optimism or previous achievements do not assure the future unless existing conditions are fully realized, an adjustment is made to meet new demands and advantage is taken of every opportunity to advance the profession as such.

A great deal has been accomplished during recent years in improving the educational standard of the profession. Furthermore, the profession has rendered a wonderful service in controlling outbreaks of infectious diseases, safeguarding human health and in contributing to the advancement of scientific knowledge. Has the profession advanced to the extent which it should have by virtue of these achievements, or has it rested in excessive confidence that educational advancement, service and scientific attainments assured the future? Has it not overlooked, or at least neglected, the capitalization of its own merits and achievements in a manner which would create a much more favorable public impression than that which generally exists? It would almost appear, with the present various branches of veterinary endeavor supplanting the days when the treatment of a few species of animals constituted its principal sphere of work, that the profession had become timid or fearful of the possibilities and responsibilities which its comparatively recent development has brought about. Such a condition is, of course, detrimental to advancement. Confidence and a determined, far-reaching propaganda directed toward public enlightenment as to the real nature of veterinary science are probably more needed at present than at any time in the history of the profession. Public demand or appreciation is the foundation of future development. It must be developed and fostered by keeping the profession and its achievements constantly before the public, or, in other words, the profession must familiarize the public with what it is accomplishing, with its educational advancement and the scientific public service it is rendering. If left to the mercies of those we serve, the advancement of our professional standing will be, to say the least, slow.

In a recent issue of the A. V. M. A. JOURNAL a correspondent of *The Veterinary Record* was quoted as follows: "The correction of an erroneous public impression of the standing of the profession comes better if not too consciously sought, and to take leave of the modesty becoming a profession hardly illustrates the adaptation of adequate means to ends."

The conservative idea thus expressed is no doubt true if certain methods for correcting public impression be adopted—methods involving extreme claims or boasting. There are, however, numerous ways in which the public could be enlightened as to the real nature of veterinary science without departing from any obligation to professional modesty and which would result in increased appreciation. "The strength of the chain rests in its weakest link," is a saying in many instances applicable to the opinion held concerning the veterinary profession as it is often judged by men professionally or personally known to certain individuals. In order to standardize the

profession to the public its collective strength must be placed before it in such a manner that the profession as a profession will be placed beyond the standardizing influence of environment or local recognition. A profession in the role of protector to an industry representing practically ten billions of dollars, and one which, besides its economic significance, bears such an important relationship to human health, is surely entitled to bring these things before the public in the interests of the livestock industry and human health as well as for the advancement of its own standing.

Unfortunately, a considerable amount of work carried on by veterinarians is not being credited to the veterinary profession. In the field of preventive medicine the veterinary sanitarian is indispensable and his usefulness and importance in this work are constantly growing. It is surprising and deplorable, however, that men engaged in this branch of veterinary science are frequently not associated by the laity with the veterinary profession at all, but are thought to have had some special medical training fitting them for this particular work. That such a condition should exist is the fault of the profession or of the individual and needs correction.

In reviewing the accomplishments of Federal and State livestock sanitary officials during the past year, one can not help but feel that the truly wonderful work of these men in controlling livestock losses is a thing altogether too much taken in the course of events by veterinarians themselves, not understood nor appreciated by the public, and therefore not being capitalized for the advancement of veterinary science. With practically all countries outside of the United States and Canada suffering great losses from various infectious diseases, due, as Dr. Mohler has pointed out, to the inability of these countries during the war to give proper or usual attention to the suppression of infectious diseases of animals, the North American Continent is enjoying comparative freedom from serious livestock losses and has been protected from an invasion by any of these non-indigenous diseases. The magnitude of the work involved, the efficient service rendered and its economic significance are in themselves justification for a different standing and appreciation than that which the profession enjoys.

The accredited herd plan is another illustration of a work which should be capitalized to the benefit of the profession. This wonderful undertaking, carried on by Federal and State veterinarians, although in its infancy, has already developed to a point where over 125,000 animals are being tested for tuberculosis each month. The great importance of this work to the livestock industry and to humanity can hardly be estimated. In the interests of veterinary science it certainly should be given more publicity, not only to the farmer and those directly interested, but to the medical profession, antituberculosis societies and to the general public.

The veterinary profession is not, openly at any rate, cooperating with the various medical societies nor with the antituberculosis societies of the country as it should be. Such a cooperation would do much for the future of our profession and materially assist in improving its standing. It should be more forcefully pointed out to the medical profession that the veterinary profession of today is no longer confined in its activities to the treatment of sick animals, but that it is one embodying the scientific principles of preventive medicine and having no small amount of significance in relation to human health in addition to the protection afforded our great and growing livestock industry.

Before leaving the subject of public appreciation, I wish to mention the odious condition existing in one of our States as a result of

recent State legislation regarding vaccination of swine by the farmer. While factors other than lack of appreciation were no doubt instrumental in bringing about such a condition, it aptly illustrates the need of public enlightenment regarding the veterinary profession.

Another matter affecting the future of the profession and concerning which collective strength or pressure must be brought to bear is the remunerative possibilities of the veterinary profession and the compensation given Federal and State livestock sanitary officials. The latter problem has been attacked, although I believe the matter is at present in abeyance. Largely as a result of loyalty, these departments have retained highly qualified and capable men for carrying on the important work they do, although there have been difficulties in this connection. What of the future? Can we expect men of high professional qualifications, the progressive, ambitious type, desirable for this work, to be induced to take it up when other fields of endeavor offer a great deal more by way of compensation? With increased entrance requirements to our schools and a period of study equal to that required by most and more than many professions, the prospective student looks for tangible examples of what his earning possibilities will be. An average made on a strictly professional earning basis will not look very favorable for the veterinary profession. Is this not one of the principal reasons for our present low college enrollment? When will it change, and what are we doing to change it?

Looking to the future, one can, of course, see possibilities, but I believe that we are at a crisis which demands the whole-hearted, collective and individual support of the profession in influencing these conditions, if we are to assure the efficiency, personnel and advancement of the future for which we look. This organization represents the leaders of the profession in North America, and it would seem that more consideration should be given to these problems in our meetings. They are frequently discussed by individuals and are no doubt in the minds of many during these times of general business depression, but they are not discussed nor acted upon by official organizations. With increased responsibility, greater demands for efficiency and an ever-broadening field of professional activity it is a part of this organization's duty to pledge its influence in having this advancement met at least part way by the public. We can not be indifferent to existing conditions and tendencies. Some of them are not pleasant nor exactly inspiring, but therein rests our duty.

There is little need of speaking of loyalty to a gathering of this kind. I wish to offer a few thoughts, however, regarding its significance in influencing the future of veterinary medicine. The prospective student, or possibly his parent, before deciding upon a professional calling usually seeks the advice and opinion of some member of the profession under consideration. It has been my experience to encounter many veterinarians who do not hesitate to state that any farmer or other individual who might ask their advice would be strongly advised against taking up the veterinary profession. With conditions as they are today the percentage of the profession which inclines this way is too great. Its influence on the future is, although we may hesitate to admit it, having a very strong influence on our schools and consequently on the future. Men holding official positions are much more inclined to advise young men to take up the veterinary profession than are practitioners, and in this respect there are wonderful possibilities before Federal and State officials. Their counsel is frequently sought, and their opportunities both in public and private for boosting the profession are many. Let each be a booster.

The few thoughts I have endeavored to bring out offer nothing

new, but it is hoped that they may serve as a stimulus to more consideration and action in connection with some of the problems which confront the profession and which are not going to be overcome by mere optimism and assurance of the future.

In conclusion, I wish to express my appreciation of the honor conferred upon me by the chairmanship of this section and of the cooperation and support which I have received during my term of office.

Your section officers have made an earnest endeavor to arrange a program in accordance with the wishes of those interested in this section. We have invited criticism of previous programs and suggestions for the present one. The majority have expressed the opinion that there should be more time for discussion and not as many papers as in previous years. As you will observe from the program, this has been carried out. We trust that the discussions will be both lively and beneficial, that all will enter into the spirit of the sessions and in so far as possible take part in the discussions.

REPORT OF SECRETARY OF SECTION ON SANITARY SCIENCE AND POLICE

CHAIRMAN JAKEMAN: The next will be the report of the secretary of the Section on Sanitary Science and Police.

(Dr. Hoskins read the following report:)

First, just a word to explain my presence here again as secretary of your section. Last year I declined reelection, not because I was unwilling to serve longer, but because I had held the office for three years and believed that a change might be of benefit to the section in particular and the Association in general. You elected Dr. B. T. Simms of Oregon to succeed me. During the year it became necessary for Dr. Simms to resign, owing to his inability to serve the section as secretary. At the urgent solicitation of your chairman, President White appointed me to fill out the unexpired term of Dr. Simms.

You may be impressed with the small number of papers on our program. This is largely intentional. We have been more or less severely criticized in previous years for our programs being overloaded. This was not entirely within the control of the section officers, however. The heavy program materially shortened the time available for discussion, and this was the greatest objection. We hope that full advantage will be taken of the time available for discussion of the papers presented this year.

Attention should be directed to the reorganization of the section work this year. The old Section of College Faculties and Examining Boards now becomes the Section on Education and Research. So far as our section is concerned, this realignment has had the effect of taking from this section a large number of papers that would ordinarily have been given in this section under the former arrangement. The effect of this reorganization of the section work may be seen in the program this year. Whether it is satisfactory to the majority of the members rests with the members themselves. We see what the possibilities are, in the case of such a subject as infectious abortion. We have this subject being presented, in various phases, in each of the three sections. Your secretary believes that the present arrangement is probably the best that we have had so far, and that many of the present unsatisfactory features may be largely eliminated by closer cooperation of the section officers in the matter of building up the programs for the section meetings.

H. PRESTON HOSKINS, *Secretary*.

PRESENTATION OF PAPER

CHAIRMAN JAKEMAN: Next will be a paper by Dr. Munce on "The Importance of Preventive Measures in Controlling Animal Diseases."

(Dr. T. E. Munce read his paper, which appeared in the January, 1922, issue of THE JOURNAL.)

ELECTION OF OFFICERS

CHAIRMAN JAKEMAN: We have one more paper to come before this section which does not appear on the program, but Dr. White has stated that there will be some time available at tomorrow's session. We still have the election of officers for this section, and I think we had better proceed to that at this time. Nominations for chairman of this section are in order.

DR. KIERNAN: I nominate R. C. Reed, of Maryland.

DR. EICHHORN: Dr. Fitch, of Minnesota, has been nominated.

(Moved that the nominations be closed; seconded and carried. A ballot was taken, in which Dr. Fitch received 11 votes and Dr. Reed 4. Dr. Fitch was declared elected chairman of the Section on Sanitary Science and Police.)

CHAIRMAN JAKEMAN: Nominations for secretary are in order.

DR. REED: I would like to place in nomination Dr. Preston Hoskins of Detroit.

(It was moved, and seconded and carried that the nominations be closed and the ballot cast for Dr. Hoskins, who was declared elected as secretary of the section.)

Adjournment.

THURSDAY MORNING, SEPTEMBER 8, 1921

SECTION ON GENERAL PRACTICE

The meeting convened at 10 o'clock a. m., Dr. T. H. Ferguson presiding.

CHAIRMAN'S REMARKS

CHAIRMAN FERGUSON: This section ought to be the strongest section of the A. V. M. A. There are more practitioners members of this Association than any other class of men. We have it over the other sections in numbers, and there is no reason why this section should not be the dominating force of this Association. In fact, it ought to be that way. The practitioners ought to dominate the A. V. M. A. The reason they haven't done so has been to some extent influenced by the location of the meetings. At meetings that are held in the extreme West or the extreme East, we don't get a large attendance of practitioners, and the other men are regular attendants at the meetings. They are always here and naturally they run the A. V. M. A. They are the men that dominate and run it.

The other sections are important to the practitioner. The

Section on Sanitary Science and Police is very important to the practitioner, and the Section on Veterinary Colleges and Examining Boards is very important. The practitioner should be well posted on both of those sections, but he can get most of the papers from those sections and most of their work through the proceedings. He can keep in close touch with the work of those sections through the proceedings. At the meetings he should give his undivided attention to his section, the Section on General Practice, and the Section on General Practice is just what we make it. There is no chairman or other officer of the section that can make it a good section without your hearty cooperation.

In getting together this program, personally (and I think the Secretary also) I had a great deal of difficulty. In fact, the members were perfectly willing to prepare papers in case they could attend the meeting. They were very anxious to help things along, but they could not attend for business reasons.

PRESENTATION OF PAPERS

CHAIRMAN FERGUSON: We will take up the first paper, which is "Parturient Paresis," by Dr. A. A. Motley, Alpena, Michigan. Dr. Motley is not present, but he sent me the paper.

(It was voted, on motion, duly seconded, that the paper be read.)

(Secretary Muldoon read the paper of Dr. Motley, which was published in THE JOURNAL for October, 1921, page 63. The discussion following the paper was published in THE JOURNAL for November, 1921, page 200.)

CHAIRMAN FERGUSON: We will pass to the next paper, "The Veterinarian and the Public," by Dr. A. N. Carroll of Pueblo, Colorado.

(Dr. Carroll read his paper, which appeared in THE JOURNAL for December, 1921, page 315.)

(Dr. William Stephenson of Salt Lake City, who was on the program for a paper on "Coordination and Cooperation of State Sanitary Officials," was not present, neither was Dr. J. F. DeVine, who had the next paper on "Diagnosis of Pregnancy in the Bovine," nor Capt. R. A. Kelser, who was on the program for a paper on "Gangrenous Dermatitis of the Horse.")

CHAIRMAN FERGUSON: We will pass on to the next paper, "Field Observations on Loco Poisoning," by Dr. O. E. Troy, Raton, New Mexico.

(Dr. Troy read his paper, which was published in THE JOURNAL for December, 1921, page 299.)

CHAIRMAN FERGUSON: You have heard Dr. Troy's paper and his recommendation. Is there any discussion?

DR. GLOVER: The Colorado Agricultural College, in cooperation with the United States Department of Agriculture, adopted

a four-year investigation of so-called loco weed, with headquarters at Hugo, Colorado. During this time the plants representing the different species were sent to Washington for analysis, and subsequently a bulletin was issued from Washington to the effect that barium was considered probably the poison in the plant that caused the trouble. Subsequently a bulletin was issued from Washington to the effect that barium was found in equal quantities in alfalfa and that there was nothing to the barium theory. I do not believe that anyone maintains nowadays that barium is the cause of loco-weed poisoning. In fact, the poison has never been found, and I want to say that my personal opinion is that loco-weed disease should be classified with the deficiencies. Now, the animals never eat loco weed except when the grass is very short and they are getting hungry. The loco weeds are bulky and they have a very filling and very satisfying effect, with the result that the animals eat exclusively loco weed and starve to death while they are doing it.

The symptoms do not simulate any other kind of poisoning or infection that we know of. It is more like starvation. My opinion is that it will yet be revealed that it is really a deficiency disease. There is something lacking in the weed; at any rate something that fails to put nutrition in the animal. At the present time I am working from that standpoint. I may be wrong, but I think I am not.

DR. PATERSON: In answer to my old professor, I am thoroughly convinced he is wrong. (Laughter.) I have seen horses badly locoed, and after having been taken off for months and sometimes years, and then turned into a pasture and allowed to eat loco weed for one or two weeks, they would be as crazy as a bedbug. I know one horse that was off for three years, was broken and as fat as could be, and after going back to loco weed has died. It is in the fall that they are most likely to contract the disease. They contract it early in the fall and winter when the grass is short.

CHAIRMAN FERGUSON: Is there any further discussion on this very interesting paper? If not, do you wish to do anything with the Doctor's recommendation?

(It was voted, on motion of Dr. Glover, duly seconded, that Dr. Troy's recommendation regarding gathering available data on this subject be adopted.)

CHAIRMAN FERGUSON: We are unable to get the lantern. I presume that we shall have to dispense with Dr. Kingman's illustrated lecture on "Clinical Cases." I presume he will be unable to go on with it without the lantern. I am very sorry, because I am sure it would be of great interest to us.

The next paper is "Clinical Aids in the Differential Diagnosis of Common Poultry Diseases," by R. H. Beaudette. He

has sent his paper in, and if there is no objection, it will be read by title and printed in *THE JOURNAL*.

(Dr. Beaudette's paper was published in *THE JOURNAL* for December, 1921, page 283.)

CHAIRMAN FERGUSON: The next paper is "Digestive Diseases of the Dog and Cat," by Dr. F. H. McNair, Berkeley, California. He is not present.

(Dr. McNair's paper appeared in *THE JOURNAL* for November, 1921, page 170.)

DR. KINGMAN: I make a motion that we adjourn. (Seconded.)

CHAIRMAN FERGUSON: It has been moved and seconded that we close the program and proceed with the election of officers.

DR. COTTON: It seems to me that that wouldn't be the thing to do. Dr. Kingman says he can present his paper in ten minutes. We all came a good way to hear this paper, and I think that out of courtesy to him we should hear this paper. I would like to give him ten minutes. I would like to amend that motion, that we hear Dr. Kingman's paper. (Seconded.)

(Dr. Kingman withdrew his motion to adjourn, and the motion of Dr. Cotton, that Dr. Kingman's paper be heard, was carried.)

(Dr. Kingman presented his paper, giving demonstrations of the methods of suturing. His paper appeared in *THE JOURNAL* for November, 1921, page 165.)

ELECTION OF OFFICERS

CHAIRMAN FERGUSON: Nominations for chairman of this section are now in order.

DR. JACOB: I nominate Dr. Muldoon for chairman.

(The nomination was seconded by Dr. Kron.)

(It was voted, on motion of Dr. Moye, duly seconded, that the nominations be closed, and that the Secretary be instructed to cast the unanimous ballot of the Association for Dr. Muldoon. The secretary cast the ballot for Dr. Muldoon and he was declared elected.)

CHAIRMAN FERGUSON: Nominations for secretary are now in order.

DR. CARR: I nominate Dr. Kingman as secretary of this section.

(The nomination was seconded by Dr. Troy.)

DR. HUTHMAN: I move that the rules be suspended and that the secretary cast the unanimous ballot of the Association for Dr. Kingman.

(Dr. Huthman's motion was seconded and carried, and Dr. Kingman was declared elected.)

Adjournment.

THURSDAY MORNING, SEPTEMBER 8, 1921

SECTION ON VETERINARY COLLEGES AND EXAMINING BOARDS

The meeting was called to order at 9:30 a. m. by Secretary Goss in the absence of Chairman Chamberlain. Dr. W. W. Dimock was elected temporary chairman and took the chair.

DR. FITCH: Do we not have to go back to the program of Tuesday? Tuesday's program was not heard.

CHAIRMAN DIMOCK: Do you care to make that as a motion, that we go back.

DR. FITCH: I would like to inquire before I make the motion as to how many of the authors of the papers are here. Are Drs. Boerner or Stubbs here?

SECRETARY GOSS: Dr. Chamberlain, of course, is not here for his address. Neither Dr. Stubbs nor Dr. Boerner is here. Their paper is presented.

PRESENTATION OF PAPERS

DR. FITCH: I move we proceed with the paper on "Studies in Swine Abortion," by Dr. Fred Hayes of California.

(Dr. Hayes's paper was printed in THE JOURNAL for January, 1922, page 435.)

CHAIRMAN DIMOCK: We will listen to the paper of Dr. Fred R. Jones on "The Types of *Bacillus bovis septicus* Encountered in a Dairy Herd."

(Dr. Jones's paper appeared in THE JOURNAL for December, 1921, page 271.)

CHAIRMAN DIMOCK: We have some more papers for this section and some business to attend to. We will go on with the program if that is the wish of the section. Let us put this to a vote, what you will do. I understand there will be no other opportunity for this section to meet. I think we ought to dispose of these matters.

DR. MOORE: I move that this section meet after the general section.

(The motion was duly seconded and carried.)

Adjournment.

(The Executive Board has ruled that owing to the failure of this section to elect officers at a regular session, the officials of last year will be continued in office for the current year. Therefore F. W. Chamberlain is chairman and L. W. Goss secretary of the Section on Education and Research.)

FRIDAY MORNING, SEPTEMBER 9, 1921

SECTION ON SANITARY SCIENCE AND POLICE

The meeting convened at 9:45 a. m., Dr. Jakeman presiding.

CHAIRMAN JAKEMAN: This is a special meeting for the election of officers for the section.

DR. HOSKINS: Before we come to the election of officers, I want to read the resignation of Dr. Fitch. "I desire hereby to extend my resignation as chairman of the Section on Sanitary Science and Police of the American Veterinary Medical Association. (Signed) C. P. Fitch." I move that his resignation be accepted.

(The motion was seconded by Dr. Kiernan and carried.)

CHAIRMAN JAKEMAN: Nominations for chairman to substitute for Dr. Fitch are now in order.

(On motion of Dr. Eichhorn, duly seconded, Dr. R. C. Reed was elected as chairman of the Section on Sanitary Science and Police.)

Adjournment.

RESIDENT SECRETARIES FOR 1921-1922

- Alabama, D. J. Meador, Selma, Ala.
Alaska, S. Hadwen, Reindeer Investigations, Unakleet.
Alberta, J. C. Hargrave, Dominion Vet. Inst., Medicine Hat.
Arizona, R. J. Hight, Tempe.
Arkansas, J. H. Bux, Old State House, Little Rock.
British Columbia, J. W. Frank, 119 Pender St., W. Vancouver.
California, J. F. McKenna, 616 Eye St., Fresno.
Colorado, I. E. Newsom, Fort Collins.
Connecticut, A. T. Gilyard, 74 Phoenix Ave., Waterbury.
Cuba, B. Crespo, No. 20 Avenida De Italia, Havana.
District of Columbia, T. P. White, 1348 Kenyon Street, Washington.
Florida, M. Schofield, Miami.
Georgia, A. A. G. Richardson, 1234 Lumpkin St., Athens.
Hawaii, H. B. Elliott, Box 187, Hilo.
Idaho, J. D. Adams, 417 Union St., Boise.
Illinois, W. H. Welch, Lexington.
Indiana, W. B. Craig, 216 N. Meridian Ave., Indianapolis.
Iowa, K. W. Stouder, 226 Russell Ave., Ames.
Kansas, W. E. Muldoon, Vet. Div., K. S. A. C., Manhattan.
Kentucky, C. W. Fisher, 117 S. 4th St., Danville.
Louisiana, E. P. Flower, Box 24, Baton Rouge.
Maine, J. B. Reidy, State Capitol, Augusta.
Manitoba, J. B. Still, Boyd Bldg., Portage Ave., Winnipeg.
Maryland, G. H. Grapp, 2825 Clifton Ave., Baltimore.
Massachusetts, T. E. Maloney, Box 413, Fall River.

Mexico. Luis Santa Maria, P. O. Box 44, Piedras, Negras, Coah.
Michigan. B. J. Killham, Old State House, Lansing.
Minnesota. D. B. Palmer, 1054 S. E. 14th St., Minneapolis.
Mississippi. O. N. Norton, 109 Main St., Greenville.
Missouri. F. M. Cahill, 9th and Mary Sts., St. Joseph.
Montana. A. D. Knowles, 302 South 4th St., W. Missoula.
Nebraska. W. T. Spencer, State Capitol Bldg., Lincoln.
Nevada. S. Lockett, Univ. of Nevada, Reno.
New Brunswick. D. McCruaig, McAdam Junction.
New Hampshire. F. F. Russell, 17 Dartmouth St., Concord.
New Jersey. P. F. Runyon, 41 E. Main St., Freehold.
New Mexico. O. E. Troy, Raton.
New York. L. J. Tompkins, Hobart.
North Carolina. J. B. Spoon, 317 Worth St., Burlington.
North Dakota. W. F. Crewe, Bismarck.
Nova Scotia. J. Steen, Bellevue, Spring Garden Road, Halifax.
Ohio. C. H. Case, 50 E. Buchtel Ave., Akron.
Oklahoma. C. H. Anthony, 2 E. 4th St., Oklahoma City.
Ontario. J. A. Campbell, 8 Edward St., Toronto.
Oregon. B. T. Simms, Oregon Agri. College, Corvallis.
Pennsylvania. S. G. Hendren, 11 E. Market St., Lewistown.
Philippine Islands. S. Youngberg, Bu. of Agri., Manila.
Prince Edward Island. C. J. Bonsfield, 120 Upper Prince St.,
Charlottetown.
Quebec. J. O. Langevin, 51 McGill St., Montreal.
Saskatchewan. M. Barker, P. O. Bldg., Regina.
South America. E. P. Stirling, Paysandu, Uruguay.
South Carolina. W. K. Lewis, 901 Nat'l Bk. Bldg., Columbia.
South Dakota. G. S. Weaver, Brookings.
Tennessee. E. I. Smith, 405 7th Ave., N. Nashville.
Texas. F. E. Barnes, Waxahackie.
Utah. W. A. Stevenson, 308 State Capitol, Salt Lake City.
Vermont. A. J. De Fossett, Montpelier.
Virginia. T. Fraser, 316 N. Henry St., Richmond.
Washington. P. MacKintosh, 214 S. 2nd St., Yakima.
West Virginia. J. J. Cranwell, 816 4th St., Fairmont.
Wisconsin. T. H. Ferguson, 421 Broad St., Lake Geneva.
Wyoming. B. F. Davis, P. O. Box 355, Cheyenne.

President Kinsley has appointed Dr. W. H. Welch, Lexington, Ill., as resident secretary for Illinois in place of Dr. L. A. Merillat, who resigned that position.

President Kinsley has appointed Dr. W. H. Wray of Beaconsfield, England, resident secretary for the British Isles for the current year.

THE ST. LOUIS CONVENTION

President Kinsley and Secretary Mayo met Mr. Hatfield, representing the St. Louis Tourist and Convention Bureau, in St. Louis on the 19th of December, and, together with local veterinarians representing St. Louis and East St. Louis, plans were made for the 1922 convention of the A. V. M. A.

An investigation was made of the hotels, and the Planters' Hotel was selected as headquarters for the Association. The general sessions and sectional meetings will be held at the Planters' Hotel.

On Wednesday and Thursday it is planned to hold clinics at the National Stock Yards in East St. Louis, and arrangements are being made to have one of the best arranged and most interesting clinics ever held. On Tuesday evening, August 29, there will be a smoker and round table at the Planters' Hotel. The personnel of the local committees will be supplied next month.

An excellent and enthusiastic organization has been perfected in St. Louis for making this the largest and most practical meeting that the Association has ever held. N. S. MAYO.

A. V. M. A. SPECIAL COMMITTEE

President Kinsley has appointed a special committee of the A. V. M. A., consisting of Dr. J. H. McLeod, chairman, Dr. Charles E. Cotton and Dr. L. A. Merillat, to consider plans for a closer affiliation between the A. V. M. A. and State and local veterinary organizations.

PHILADELPHIA VETERINARY CLUB

The Philadelphia Veterinary Club held its regular monthly meeting, Friday evening, December 30, 1921, at the Veterinary School, Philadelphia, Pa.

Dr. Allen J. Smith of the Medical Department, University of Pennsylvania, addressed the Laboratory Section in conjunction with the Veterinary Club, regarding the need for more laboratories for the use of the veterinarians.

Dr. Harry E. Bender of Lititz, Pa., gave a talk on "The Need for Veterinary Service in Our Stock-breeding Sections."

Both subjects were very interesting and were thoroughly discussed by the members present.

The Pennsylvania State Board of Veterinary Medical Examiners and Registrars was in session and attended our club meeting.

We had in attendance sixty-one.

C. S. ROCKWELL, *Secretary*.

OKLAHOMA VETERINARY MEDICAL ASSOCIATION

The semi-annual meeting of the Oklahoma State Veterinary Medical Association was held in Oklahoma City, January 4 and 5, and the following papers and discussions were participated in:

"Opportunities of Veterinarians in Poultry Practice in Oklahoma," by Dr. C. L. Nelson; "Production of Certified Milk," by Dr. C. H. McElroy; "Normal Temperature of Animals," by Dr. L. L. Lewis; "Report on the National Progress of Tuberculosis Eradication," by Dr. Elmer Lash; "Diseases of Hogs in Oklahoma," by Dr. C. H. Fauks.

Dr. H. Jensen conducted a very spirited round table talk and Dr. A. T. Kinsley led a very spirited and instructive discussion on the diseases of hogs. On the evening of January 4 a very enjoyable banquet was attended by all veterinarians, wives and friends, at which time a discussion of a proposed veterinary college to be established at the A. and M. College of Oklahoma was held. The meeting was attended by about fifty veterinarians, with several visitors from adjoining states.

T. O. BOOTH, *Secretary*.

ALABAMA VETERINARY MEDICAL ASSOCIATION

The next annual meeting of the Alabama Veterinary Medical Association will be held at Auburn, Alabama, on February 23, 24 and 25. On the 25th an examination will be given to licensed veterinarians for testing accredited herds. It is hoped that at least two of the new veterinary buildings in the Alabama Veterinary Medical College will have been completed by that time.

C. A. CARY, *Secretary*.

CONFERENCE OF VETERINARIANS AT PENNSYLVANIA

A conference of veterinarians will be held at the University of Pennsylvania Veterinary School on February 28 and March 1. The present status of vaccines for abortion disease of bovines, diagnosis of pregnancy and treatment of sterility in the cow, hog cholera and other infectious diseases of swine, treatment of udder diseases, and other topics relating to cattle and swine will be discussed by veterinarians who are especially qualified to speak on these subjects. All veterinarians are invited. No fees will be charged. A copy of the program will be mailed on request.

INVITATION TO BRITISH MEETING

Dr. J. Basil Buxton, General Secretary of the National Veterinary Medical Association of Great Britain and Ireland, upon instruction by the Council of that Association, extends a cordial invitation to any members of the American Veterinary Medical Association who may happen to be in England to attend the meeting of the National Veterinary Medical Association of Great Britain and Ireland, which will be held at Bath from August 1 to 4, 1922.

It is hoped that any members of the A. V. M. A. who may be in Europe will try and make arrangements so that they can attend this meeting.

SOUTH DAKOTA LABORATORY SERVICE

Diseased specimens, including samples of blood and parts of diseased animals and fowls, are being received at the rate of 25 to 40 each week at the Animal Health Laboratory, State College, Brookings, S. D. These specimens come from farmers, veterinarians, county agents and other parties in all parts of the State for examination work and diagnosis. The work is carried on by Dr. C. C. Lipp and his assistants.

The aim of the laboratory force is to make the examination on the day of receipt of the specimen, so far as possible. The work is growing to such an extent, however, as to tax the capacity of the plant.

NECROLOGY

Dr. George B. Jobson died at his home in Franklin, Pa., December 16, 1921, after an illness of several years. He was born in Edinburgh, Scotland, December, 1839, received his early education at Hawick, Scotland, studied law and later became a wholesale coal merchant. He and his wife, who still survives him, came to America in 1869 and engaged in farming near Lynchburg, Va. Later he was farm superintendent for the McDonough Institute for Boys, near Baltimore. From there he was called to a similar position near Poughkeepsie, N. Y. In 1880 he came to Franklin, Pa., as superintendent of the Miller & Sibley Stock Farm, which position he filled faithfully and well for thirteen years. During his incumbency at this place one of the best herds of Jersey cattle in America was developed.

He was always active in civic, local and State affairs. He was mayor of Franklin in 1897 and served for a number of years on city council. He assisted greatly in organizing the State Livestock Sanitary Board of Pennsylvania, was one of the original twelve men selected to enforce the new meat inspection law and was always helpful in enforcing the laws and regulations of the Board. Dr. Jobson was one of the most respected members of the veterinary profession in the State. He seldom missed a meeting of livestock breeders or veterinarians. He was a good writer and a fluent speaker and contributed much toward the upbuilding of the veterinary profession and of a better system of animal husbandry in the State.

He was of the good old Scotch Presbyterian type of man, with many friends and but few enemies. He helped organize the Sunday school which later developed into the Rock Grove Presbyterian Church, was an active member of the First Presbyterian Church of Franklin, of Myrtle Lodge, F. and A. M., and a member and ex-president of the State Veterinary Medical Association.

He is survived by his widow, three sons, three daughters and ten grandchildren.

C. J. M.

Dr. Charles Barnwell Robinson died suddenly at his residence on December 19 in his 62d year, after 33 years of practice as a

veterinary surgeon in the District of Columbia. Dr. Robinson's death was a severe shock to his many friends. He arrived at home about 5 o'clock in the evening and while sitting at his desk told one of his children that he never felt better. A few minutes later he was found dead. An attack of heart trouble is believed to have been the cause of his death. Dr. Robinson was born at St. Thomas, Canada, July 26, 1859, the son of Jabel and Carolina Robinson. His father was at one time a member of the Canadian Parliament.

Dr. Robinson was a graduate of the Ontario Agricultural College and the McGill Veterinary College in the class of 1882. Upon coming to the United States he first settled in Wheeling, W. Va., but went to Washington, D. C., in 1888. In 1894 he founded the United States College of Veterinary Surgeons in the Capital City. He was elected president of the board of directors of that institution, which position he held at the time of his death. He is survived by his widow, three children, Mrs. Carrie R. Smith, and Charles J. and Joseph Robinson.

Dr. J. A. H. Winsloe, of Cooperstown, North Dakota, died on November 22, 1921.

Dr. Winsloe had been Assistant State Veterinarian of North Dakota. He was a graduate of the Ontario Veterinary College in the year 1897 and joined the A. V. M. A. in 1911.

Dr. Willard L. Linn of Holcomb, Illinois, died November 24. Dr. Linn was a graduate of the Chicago Veterinary College in 1890. He joined the A. V. M. A. in 1920. He was also a member of the Illinois Veterinary Association, and had held the position as Assistant State Veterinarian of Illinois. The wife and daughter survive him.

The JOURNAL regrets to report the death of the wife of Dr. N. Reetenwald, the oldest practicing veterinarian in Pittsburgh, and the mother of Dr. John Reetenwald, a prominent physician of Pittsburgh, Pa. Dr. John Reetenwald graduated in veterinary medicine at the University of Pennsylvania in 1894 and later completed his course in human medicine.

MISCELLANEOUS

GENERAL WOOD AND HIS FIGHT AGAINST YELLOW FEVER

On December 12, 1899, the War Department made General Leonard Wood Governor of Cuba, and at the same time it sent Major Walter Reed to investigate yellow fever in Cuba. The conjunction occurred, and one of the greatest of human events resulted. The curse of yellow fever was blotted from the earth; millions of future lives were insured an existence; great tracts of the world were made potentially habitable; commerce was stimulated; hope was created; and fears of an invisible foe were laid to eternal rest—all because two great minds met at the appointed time and place. Walter Reed could not have triumphed without Leonard Wood and Wood could not alone have rid Cuba of yellow fever.

This last statement does not detract from the greatest of either Wood or Reed. Wood is great because he was a great executive. Reed is great because he was a great producing scientist.

It is a mistake to say that General Wood's medical education made it possible for him to rid Cuba of yellow fever. Had General Wood, the executive, attempted to force his will upon Reed, the scientist, he would have proven thereby that he was a poor executive, and would have effectually prevented Reed from demonstrating that he was a great scientist. The temptation of Wood to "meddle" with Reed must have been great, and it is a valuable index of his real executive ability that he never side-tracked from his own big functions.

A big executive is a man who can assume big responsibilities, and distribute them on the shoulders of others capable of accomplishing productive results. When an executive destroys the initiative of his agents by personal interference he ceases to be big. Wood was never an executive of this kind.

In 1899, yellow fever was as terrible a mystery as the witches and warlocks of the last century. It was no respecter of persons, and it upset all the rules of quarantine and disinfection. Dr. Finley of Cuba had guessed its secrets, but he had no proof to back his claim that a certain variety of mosquito was in some way associated with the disease. Reed attempted to furnish the proof, because the correctness of Finley's observations

appeared plausible. His plans were presented to Governor Wood for approval, and funds were requisitioned. The Governor was asked by Major Reed to take the responsibility for large expenditures of money, for possible losses of life during experimental investigation, for a possible uprising among the natives, and for a step which would, in all probability, cause an upheaval at home among that class of people who bite and claw at any official who countenances an unusual undertaking.

Wood had the vision to see the possibilities presented by Reed, and with the vision to comprehend, he also had the courage to commit himself to action. The story of Reed has been told in many books, but the chronicles are silent about the bigness of Governor Wood who assumed the entire responsibility for Walter Reed's work. Fortunately the experiments were conclusive, and an astonished world had no chance to start an opposition before the big fact was known—that yellow fever was to be conquered.

Having found the cause of yellow fever, it was typical of General Wood that he lost no time in removing it. Major Reed's health was broken, and he returned to the United States to leave General Gorgas the chosen agent to make use of the knowledge that Reed had given. The Department of Public Health in Havana was at that time a rather impotent organization. The police, street-cleaning, and other departments all "ranked" it. Governor Wood changed all of this by making the Department of Health almost omnipotent. If friction developed between the Health and other departments, he solved the difficulty by giving Health the right of way. No department of health in the world's history ever possessed such power, and probably never again will health be a governor's first consideration. Here, again, Wood's breadth of vision came to the rescue in concentrating on the big thing—even to the temporary neglect of unimportant routine matters that as a rule so fully occupy the time and strength of narrow-sightedness. Wood realized that the demonstration of the correctness of Reed's theories was the biggest question before the entire world at that time, and he saw to it that no petty interests should interfere with conclusive and final practical tests. Such qualities as have been ascribed to General Wood in this paper are not exceedingly rare. Why then do we say that it was the conjunction of Wood and Reed that made the elimination of yellow fever certain? Reed and Gorgas could have answered this question. President Roosevelt answered

it when he said "Good executives are rare, but good, honest leaders are very rare. Both make great men. But when a man is a great leader and a great executive as well, he becomes a superman. Such a man is Leonard Wood."—*Abs. from The Alumni Register, University of Pennsylvania, vol. 24 (1921), No. 2, p. 90, by Col. Henry Page, U. S. A., retired.*

GOVERNMENT SCIENTIFIC PERIODICALS SUSPENDED

"A group of the most important scientific periodicals in America have suspended publication. Uncle Sam is the publisher. The Department of Agriculture is editor. Uncle Sam, through his Congress, said not long ago: 'Quit publishing all periodicals on December 1 unless I tell you in each case specifically to continue.' Then Congress adjourned without giving anyone or any committee authority to determine which periodicals should keep on appearing. As a result some forty-one publications issued by the Government departments have suspended publication, in most cases without even the customary obituary notice. From a scientific standpoint, of those that are suspended, four Department of Agriculture publications are the most important—*The Experiment Station Record, The Journal of Agricultural Research, Meteorology, Public Roads*. Four other Department of Agriculture periodicals were doing a real service. *The Weekly News Letter*, circulation 126,000, kept the 106,000 collaborators and employees of the department in touch with its activities and served to take current information to those especially interested in agriculture. By suspending the forty-one Government periodicals, it has been estimated that from \$500,000 to \$1,000,000 will be saved each year. This is false and mistaken economy, so far as science is concerned. Science or research of any kind that is allowed to rest in the notebooks of the researcher will not travel very far. Only when scientific facts are sown broadcast on the printed page, only when they reach the fertile minds of other scientists, will they eventually bring about the maximum of improvements in methods and culture that allow the farmer to grow more and better crops and livestock. It is not inconceivable that the suspension of the quartet of periodicals mentioned will cause a much greater loss to the country than the supposed saving on all forty-one periodicals."—*Washington Herald*.

JOURNAL

OF THE

American Veterinary Medical Association

FORMERLY AMERICAN VETERINARY REVIEW

(Original Official Organ U. S. Vet. Med. Ass'n.)

J. R. MOHLER, Editor, Washington, D. C.

A. T. KINSLEY, President, Kansas City, Mo. N. S. MAYO, Secretary, Chicago, Ill.
M. JACOB, Treasurer, Knoxville, Tenn.

Executive Board

GEO. HILTON, 1st District; T. E. MUNCE, 2nd District; S. E. BENNETT, 3rd District;
J. A. KIERNAN, 4th District; C. E. COTTON, 5th District; B. W.
CONRAD, 6th District; CASSIUS WAY, Member at Large

Sub-Committee on Journal

S. E. BENNETT J. A. KIERNAN

The American Veterinary Medical Association is not responsible for views or statements published in the JOURNAL, outside of its own authorized actions.

Reprints should be ordered in advance. Prices will be sent upon application.

Vol. LX, N. S. Vol. 13

March, 1922

No. 6

FOOT-AND-MOUTH DISEASE SWEEPS GREAT BRITAIN

FOOT-AND-MOUTH disease has become so firmly established in Continental Europe as to be practically epizootic in many countries of the Continent. Owing to proximity to the Continent, Great Britain is especially exposed to the infection of this disease. While it has appeared at intervals in the British Isles it has not been permitted to become established owing to methods adopted by the British Board of Agriculture in dealing with outbreaks. The policy of the British authorities is to quarantine promptly the area or district in which the disease appears and to slaughter all diseased and exposed ruminants and swine, following such procedure with a thorough disinfection of infected premises. During the past three years there have been repeated outbreaks of foot-and-mouth disease in England, making it necessary to maintain since that time a practically continuous prohibition upon importations into the United States and Canada of cattle, sheep and swine from England.

Scotland during this period had placed an embargo upon the shipment of feed, fodder, ruminants and swine from England

and Wales into Scotland, and until January of this year had, apparently, been successful in excluding the disease. Now it would seem, however, that from some unknown source the disease has broken out not only in England but also in Scotland and that twenty-seven counties in England and twenty-four in Scotland have been quarantined by the British authorities. This information is based upon cable and wireless messages received from the inspector of the Bureau of Animal Industry at London reporting outbreaks in England on January 2 and January 25, and the more serious extension of the disease in England and into Scotland on January 30 and subsequently.

Thus with thousands of cattle infected with foot-and-mouth disease throughout the midlands of England as well as Scotland, that country is faced with the most serious outbreak it has known in 30 years. Officials of the Ministry of Agriculture are working day and night slaughtering infected animals as fast as exposure takes place and meat in some markets has advanced 10 cents a pound as a result of an order forbidding the marketing of any but inspected cattle. Sir Stewart Stockman, Chief Veterinary Officer of Great Britain, has expressed the hope that within a few weeks there would be an end of fresh outbreaks.

He is unable to furnish any exact information as to the source of the disease. After twenty years of study of the infection, he has not been able to ascribe it to foodstuffs or human beings, but to migratory birds and to air currents bringing the virus from infected countries. More directly still, he is inclined to incriminate the stress of weather which causes the migration of birds to his country. He also states that there would not be the present story to tell if some of the local authorities had moved more expeditiously in nipping the disease in the bud. The whole area of Great Britain is included in the range of the disease, the total number of herds infected being 643. The loss in livestock to date on account of the epizootic is put at more than \$2,500,000. All movements of ruminants and swine have been prohibited throughout all of England. In the last outbreak of comparable dimensions four hundred thousand head were slaughtered and their carcasses buried before the disease was stamped out.

Owing to conditions existing at this time in Great Britain

and the Continent of Europe, permits for the importation of ruminants and swine from any part of Great Britain or the Continent are not being issued in either the United States or Canada. This action is considered necessary in order to guard against the introduction of this serious disease of livestock into the latter countries.

DISEASE OF LIVESTOCK ON WANE

TUBERCULOSIS, the worst enemy of the livestock industry, is now definitely slated for ultimate control, the plan of attack having been already laid out and successfully demonstrated by the cooperative work of State livestock officials, cattle owners and the Bureau of Animal Industry. The success of the different phases of the plan and figures showing the progress made are given in the annual report of the latter bureau recently issued. In the beginning of the campaign, which began four years ago, most of the work was devoted to cleaning up and accrediting individual herds, but now that sentiment has been sufficiently aroused, definite areas in various States are being freed of the plague, and it is shown that its eradication is as feasible as the cleaning out of the cattle tick in the Southern States.

Although unfortunate entanglements with political issues have delayed the tick eradication work in some localities, the territory relieved from the grip of the cattle tick has been increasing gradually, and the time is not far distant when this enemy of the livestock industry will no longer be a factor in the cost of meat and milk production. More than 32,000 square miles were released from quarantine during the year, and since the beginning of the fight in 1906 more than 500,000 square miles have been freed, which is better than 70 per cent of the original ticky area.

The elimination of hog cholera, on the other hand, is considered a remote possibility, but swine growers are reminded that they may reduce their losses to a negligible amount by precautionary measures, which include the serum treatment. There are a number of other livestock diseases of a serious nature that continually threaten to invade the flocks and herds of this country, but during the year none of them passed the guard maintained at all ports and along the borders. Foot-and-mouth disease in

western Europe and rinderpest in the Philippines are among the most imminent dangers to our livestock.

But the bureau works at both ends of the problem of keeping up an adequate supply of livestock. In addition to protecting against undue losses from various causes, it is working to improve the various kinds of domestic animals in quality and efficiency through breeding experiments, cow-testing associations, bull associations, and the "Better Sires—Better Stock" campaign which has achieved very satisfactory results in stimulating greater interest in the use of purebred sires of all kinds. Up to the end of the fiscal year there were 452 cow-testing associations, with a membership owning 194,000 cows with an average production 50 per cent greater than for the country as a whole; bull associations numbered 158, with 5,064 members who owned collectively 672 bulls of high quality; in the year 2,212 persons joined the "Better Sires—Better Stock" movement, making a total of 4,290 persons who have filed written declarations that they will use good, purebred sires for grading up all classes of livestock kept, including poultry.

One of the interesting developments of the breeding work is contained in the announcement of the making of a new general-purpose breed of fowl that has been named the Lamona. It is the only breed of the class that lays a white-shelled egg, the kind that is in demand on most of the big markets. Progress has also been made in perfecting a new breed of sheep, the Columbia, a type that is well adapted to range conditions and that produces lambs noticeably large at weaning time.

New feeds and new methods of feeding are being tried out at the bureau's various farms, and particular attention has been given to overcoming the tendency to produce soft and oily pork in sections where peanuts, peanut meal, soy beans, rice by-products and mast are fed. In parts of the country where there is an obvious need for a certain kind of livestock farming efforts have been made to have animals introduced and to develop markets for the products. In this way butter production in Tennessee and Mississippi have been increased approximately 50 per cent within the year, and the cheese industry has been established in North Carolina and is being developed in other Southern States.

Among the specific needs of the livestock industry one of the

most pressing is more provision for indemnities for cattle destroyed in the tuberculosis eradication work in cooperation with the States and counties. In some cases a great deal of money and valuable time have been wasted by failure to provide money for the continuation of experimental work that must be carried on uninterruptedly to be of value. Many of the problems that need to be worked out for the good of the industry and the welfare of the country are such as to require years and even decades of study.

A CUBAN-AMERICAN VETERINARY ENTENTE CORDIALE

THE HONORS and courtesies accorded to Dr. A. Eichhorn as the official delegate of the American Veterinary Medical Association to the recent Cuban Medical Congress will evoke, we are very sure, a most cordial feeling of appreciation and reciprocal good will on the part of the membership of our Association and the American veterinary profession toward our Cuban confrères. The National Veterinary Association of Cuba did a most gracious thing in inviting our Association to send a delegate to the Congress as the guest of the Cuban Association, and this invitation was accepted in like spirit when President Kinsley appointed Dr. Eichhorn as our representative. The cordial hospitality with which Dr. and Mrs. Eichhorn were entertained was characteristic of the warm-hearted nature of our Cuban neighbors. The honors conferred upon Dr. Eichhorn were, as he modestly says, a tribute to the Association which he represented.

The rapid progress made and the high ability shown by the veterinary profession of Cuba, as revealed in Dr. Eichhorn's interesting report elsewhere in this issue, are matters for congratulation and appreciation. The cooperative spirit shown by the twin professions of human and veterinary medicine in a general medical congress is both gratifying and commendable.

We hope that this happy occasion is but the beginning of better acquaintance and fraternal relations between the veterinarians of the North American Continent and those of the Island Republic.

LAST CALL FOR PAYMENT OF DUES

One hundred and eighty-nine delinquent members of the American Veterinary Medical Association will not receive next month's JOURNAL unless they pay their dues promptly to the Secretary. A hint to the wise should be sufficient.

A CORRECTION

The name of Dr. H. Phipps should have been included as joint author with Dr. F. M. Hayes of the paper on "Studies in Swine Abortion," presented at the Denver convention of the American Veterinary Medical Association and published in THE JOURNAL for January, 1922, page 435. Although the paper was printed in the form in which it reached the editor and in the exact way it appeared in the official program, it seems that this was not the form in which the authors submitted it. The omission of the name of Dr. Phipps evidently occurred in copying by the official stenographer of the Section.

DETERMINATION OF SPECIES

"The old ones are the best," remarks the *Journal of the American Medical Association*, in its department of "Tonics and Sedatives," as it resurreicts this story:

Two negroes were engaged in conversation when one of them became very much annoyed by the persistent attention of a large fly.

"Sain, whut kin' a fly am dis?"

"Dat am a hoss fly."

"Wut am a hoss fly?"

"A hoss fly am a fly whut buzzes 'round cows an' hosses an' jackasses"——

"You ain't makin' out for to call me no jackass?"

"No, I ain' makin' out for to call you no jackass, but you can't fool dem hoss flies."

WHY HEALTH DEPARTMENTS ARE INTERESTED IN THE TUBERCULOSIS ERADICATION CAMPAIGN¹

By W. A. EVANS, M. D.

Health Department, The Chicago Tribune, Chicago, Illinois

I CANDIDLY CONFESS that I have been out of touch with the situation for a number of years, but, as Dr. Mohler has said, I pioneered the way. I was in the movement when there were no bouquets, but a great many brickbats. The occasion of a tuberculosis meeting was one that the people honored with their absence, or, if they came at all, they came provided with implements of war. To walk into this room a while ago to find the room crowded with intelligent men from all parts of the country, and to learn, not only by their presence, but by the statements from others, just how extensive the movement has grown in the past ten years, was a source of a great deal of pleasure to me. I see some familiar faces. I see some battle-scarred veterans in this audience. I don't feel altogether out of place.

Because of my fight for the Chicago milk ordinance of 1908 I am popularly supposed to be something of a pioneer, and, as such, I am invited to give an answer to the question, "Why health departments are interested in the eradication of bovine tuberculosis?" You will be interested in a brief discussion of that ordinance and what it led to.

The ordinance provided for tuberculin testing with pasteurization as an alternative. It was passed in July, 1908, and became effective in January, 1909. While it was passed without difficulty, it was not permitted to stand without efforts to rescind, by act of the city council; to render nugatory, by acts of that body and also by acts of the legislature, and to overturn by court decision.

It was not the first tuberculin-testing ordinance by any means. In Milwaukee, Louisville and various other places tuberculin-testing laws had been passed and had even been upheld by the courts, but in the long run it had been found impossible to enforce them.

The efforts to rescind the Chicago ordinance of 1908, made in

¹ Presented at the Tuberculosis Eradication Conference, Chicago, Ill., Nov. 25 and 26, 1921.

1908 and 1909, failed. In 1912 the Council passed an amendment which made it possible for a favorable administration to suspend in fact the tuberculin-testing and pasteurizing requirements for certain groups having considerable political influence. In 1916, however, the succeeding administration took advantage of its powers and forced all milk dealers not conforming to the basic requirements as to tuberculin testing and pasteurization to conform. The Illinois Legislature passed a State law providing that no city should pass a tuberculin-testing ordinance. It is the judgment of the best lawyers that the law is either unconstitutional basically, or at any rate does not affect the Chicago situation.

While Chicago was not the first city to pass an ordinance of which tuberculin testing was a principal feature, according to Nathan Straus it was the first city to pass a compulsory pasteurization ordinance. Since 1908 many cities have passed ordinances based on the principles of the Chicago ordinance, and several States have taken similar action. Wherever these ordinances have been passed upon by the courts in Illinois or elsewhere they have been upheld.

In great measure as a result of the action of the Illinois Legislature—which in turn resulted from the fear built up by interested parties out of the features of the Chicago ordinance—tuberculin testing and the eradication of bovine tuberculosis slowed up materially. It is, therefore, retribution that an Illinois State Veterinarian, Dr. A. E. Dyson, should have devised the new accredited plan from which such good results are coming and to further the good work of which you are meeting in consultation.

With these preliminary statements, I turn to the question, "Why are health departments interested in the eradication of bovine tuberculosis?"

Perhaps as good an answer as any is that given by the British Board of Agriculture in issuing rules for the control of bovine tuberculosis, May 1, 1913, which they saw were in the interest of public health as well as of agriculture. (Parkes, *Practical Hygiene*, 1913.) Stating it in our language, it is because—

1. Bovine tuberculosis causes disease and death directly by infecting human beings.

2. It lessens the supply of milk and increases its cost, thus

indirectly predisposing to tuberculosis and other preventable diseases.

3. It lessens the meat supply and increases its cost and in other ways increases the cost of living. Thus through economic factors it appeals to health departments.

4. It decreases the profits to the milk producer and farmer. This of itself is sufficient to interest the department of health.

5. The relationship between the human and bovine tubercle bacilli leads health departments to the opinion that, while programs for the repression of human tuberculosis which take no note of tuberculosis in other animals may be successful, the time to strike for suppression of human tuberculosis can not come until the program for control of bovine tuberculosis is well advanced.

The first of these points is the only one that I can discuss at any length.

1. *Bovine tuberculosis causes disease and death directly by infecting human beings.*

In Chicago the death rate from pulmonary tuberculosis is falling rapidly. The average rates per 10,000 living, by 10-year periods, were:

1871-1880—16.94
1881-1890—17.81
1891-1900—16.53
1901-1910—15.72
1911-1920—12.95

Rejecting the decade 1871-1880 as possibly quite inaccurate, we find a decline of 1.3 in the nineties, 1.8 in the first decade of this century, and of 2.8 in the second decade, in each instance in comparison with the preceding decade.

In the group of deaths from tuberculosis other than pulmonary the following are the figures:

1871-1880—4.61
1881-1890—2.44
1891-1900—2.30
1901-1910—2.48
1911-1920—2.02

Assuming that the data for 1871-1880 are quite undependable, and beginning with 1880, we find that no decade prior to 1910 showed any improvement, but that the drop of 0.42 in 1911-20

is a greater proportionate drop than that in the pulmonary tuberculosis rate.

These are Chicago figures, and we might assume that the milk ordinance is responsible. This assumption is not entirely justified, for not all the deaths grouped as tuberculosis other than pulmonary are due to drinking milk infected with tubercle bacilli. There is no better summary of the evidence as to what forms of tuberculosis are due to bovine bacilli than that of Park (Public Health and Hygiene, 1920). In discussing bovine bacilli infections of human beings, his conclusions are:

As the result of a large series of cases reported by ourselves and others it has been shown—

1. That children are especially infected, and usually the point of entry is the alimentary tract.
2. That cervical adenitis and abdominal tuberculosis are the most frequent types of infection.
3. That generalized tuberculosis due to bovine tuberculosis is less frequent.
4. That bone and joint tuberculosis is most commonly of the human type.
5. That the meninges are less commonly infected by the bovine than by the human type.
6. That the infection of adults by bovine bacilli is very infrequent.
7. That pulmonary tuberculosis due to bacilli of the bovine type is rare.

On each instance he is speaking of human tuberculosis. The basis of his conclusions he puts in two summarized tables.

TABLE 1

Diagnosis	Adults 16 years and over (Per cent)	Children 5 to 16 (Per cent)	Under 5 (Per cent)
Pulmonary tuberculosis	0.2	0	0
Cervical adenitis	4	37	57
Abdominal tuberculosis	16	50	68
Generalized tuberculosis	3	40	66
Meningitis	0	0	15
Tuberculosis of bones and joints.....	5	3	0
Total number of cases studied.....	686	132	220

Grand total studied, 1,042 cases, of which 4 were infected with both varieties of bacilli.

However, Park thinks we get a better idea of the importance of bovine bacillus infection in the human subject when we deduce the percentages of certain serious infections due to bovine bacilli. This he puts under what he calls his revised table.

REVISED TABLE 2

Diagnosis	5 to 16 years	Under 5
Abdominal tuberculosis	66	69
Generalized tuberculosis of alimentary origin.....	60	48
Generalized tuberculosis	20	11
Tubercular meningitis secondary to tuberculosis of alimentary type.....	0	72
Tubercular meningitis (other than preceding).....	0	6

The reason for offering the revised table to replace Table 1 is that it shows the importance of bovine infection in those forms of tuberculosis of children which are of great severity.

The summarized conclusion of Park is as follows: "A careful study of all the factors leads us to estimate that about 10 per cent of all deaths caused by tuberculosis in children under 5 years of age is due to infection through drinking raw cows' milk."

There were 1,096,436 deaths from all causes in the registration area in 1919. Of these, the total number of deaths from all tuberculosis was 106,985, and the total number of deaths of children under 5 from all tuberculosis was 5,830. The estimate of Park is that in 1919, 583 children under 5 years of age died of tuberculosis due to bovine tubercle bacilli in the registration area. This is an estimate only of the deaths due to tuberculosis in children under 5.

The theory of Von Behring as to the cause of tuberculosis in adults is now decidedly in the ascendant. It is that much, if not most, of the clinical tuberculosis of adult life is the result of infection which has lain dormant for more than decade and is developed into a clinical disease by some period of stress. This theory magnified the importance of infections in childhood, and incidentally of infections with bovine bacilli.

There have been no adequate studies to determine the possibility that a bovine bacillus infection in childhood may result in the excretion of bacilli conforming to the human type in adult life. In fact, the typing of bacilli excreted by adults having tuberculosis has been wholly inadequate.

Some other, but more generalized opinions, are as follows:

Park (Public Health and Hygiene, 1920): The bovine type is pathogenic for almost all mammalian animals. The widespread existence of the disease in the cattle from which we derive all the milk renders the bovine bacilli an important etiologic factor in connection with tuberculosis in children.

Parkes (Practical Hygiene, 1913): Children under 5 years of age have a higher mortality from tuberculosis than exists at any subsequent five-year period. This fact seems to point to the disease being maintained among infants through the agency of infected milk.

The British Royal Commission on Tuberculosis, Second Interim Report, says: "The above facts seem to indicate that a very considerable proportion of the human tuberculosis contracted by ingestion and urinary invasion of the abdominal organs is due to tubercle bacilli of bovine source."

Newsholine (Medical Officer, May, 1921), says: "If we are to reduce the amount of tuberculosis and to save children's lives, the prevention of exposure to infection during the first four or five years, and especially during the first two years, is of supreme importance."

Shennan (*Annals of Pasteur Institute*, September, 1920), commenting upon the Calmette-Guérin communications, advises the protection of young human beings by vaccinating them with bovine tubercle bacilli, alternated according to the Calmette-Guérin method.

E. C. Schroeder (JOURNAL OF AMERICAN VETERINARY MEDICAL ASSOCIATION, July, 1921) says that the bovine bacillus is responsible for tuberculosis in children, and adds: "Every case of tuberculosis in the human subject due to bovine bacilli must be charged to intimate contact, in most cases through the ingestion of contaminated dairy products, between persons and tuberculous cattle."

Parkes (Practical Hygiene, 1913): In 25 per cent of all human tuberculosis in children under five years of age and in over 40 per cent of abdominal and joint tuberculosis during this age period, the bovine species of germ is present.

Scott (*Annals of Tropical Medicine and Parasitology*, September 30, 1921) says that in 225 cases of tuberculosis of children in China, 15.71 per cent were alimentary in origin. In adults 12.3 per cent of the cases studied were alimentary in origin.

2. *It lessens the supply of milk and increases its cost, thus indirectly predisposing to tuberculosis and other diseases.*

Parkes (Practical Hygiene, 1913, says that in the early stages the milk secretion is as abundant as ever, nutrition is not interfered with until the disease is well advanced, and even

then the amount of milk yielded, though poor in quality, may not be diminished, and the dairy farmer continues to keep the animal in stock.

I think it is generally held that the tuberculous cow gives even an augmented volume of milk at the beginning of her disease, but that often it suffers both in quantity and quality. The existence of tuberculous infection in a milk cow must cause an increase in the brokerage rate on the food supplied her. However, you know the literature on this phase of the question better than I do, and you are in a better position to evaluate the evidence.

As a health administrator, I have no hesitation in saying that anything which materially decreases the supply of milk, or which materially increases its price, makes against the public health by lowering the rate of growth of children and lowering their nutrition levels.

3. It lessens the meat supply and increases the cost of living.

On this point your opinion is better than mine.

Again, whatever increases the cost of living is detrimental to the public health. Those who do hard work must have meat at a reasonable price, or their health suffers somewhat, likewise their efficiency.

4. It decreases the profits to the milk producer and farmer.

On the question of decrease in profits to the milk producer and farmer your opinion is also better than mine.

5. One of the most interesting and instructive contributions on the fifth point, namely, the relation of bovine bacillus to the perpetuation of tuberculosis, is that of Schroeder (*JOURNAL OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION*, July, 1921). Schroeder says that the bovine form of the tubercle bacillus is "the supremely pathogenic type." It is responsible for tuberculosis in cows, in hogs and in children. Although hogs are infected from cows, the bovine bacilli in them do not infect other hogs and they are not a source of reinfection of hogs. From the epidemiologic standpoint as regards cows, porcine infection is a blind alley. Likewise the bovine bacillus in the young human body multiplies but it does not infect other human beings. Nor is this a source of infection of cows. From the same standpoint, it, too, is a blind alley. The cow is infected by infected cows. The infected cow infects other cows, pigs, human beings, and other animals: the latter but rarely, however.

Every case of tuberculosis in human subjects due to bovine

tubercle bacilli must be charged to intimate contact, in most instances through the ingestion of contaminated dairy products between persons and tuberculous cattle. The human tubercle bacillus, while very important from the standpoint of human tuberculosis, requires no consideration whatever in bovine tuberculosis eradication projects, since cows are immune to it.

Tuberculosis among hogs is unimportant except as it indicates the extent of tuberculosis among cows and the economic waste it occasions. Tuberculosis among fowls is due to the avian type of the bacillus. This bacillus does not cause tuberculosis among mammals nor can the forms of mammalian tuberculosis cause tuberculosis among fowls.

According to this view, no campaign for the suppression of tuberculosis is logical that does not take into account the bovine bacillus.

To meet point 1, universally applied, properly controlled pasteurization would be effective, likewise the universal use of dried milk. But there is great difficulty in getting that kind of pasteurized milk except in the cities. The farmer himself, his family and his livestock, and the people in the towns and smaller cities, will continue using raw milk for a long time. Pasteurization does not offer a remedy for the conditions covered in points 2 to 5, inclusive.

I am informed that the accredited plan for the gradual eradication of bovine tuberculosis promises to be as successful as was the similar plan for the eradication of tick fever. I am glad that Dr. Kiernan, who had so much experience in tick eradication, is lending his experience to the tuberculosis eradication plan.

Dr. L. E. Day informed me that in October, 1921, there were in the United States 10,572 accredited herds and in them there were 243,365 cattle; that, in addition, there were 936,858 cows about ready to be accredited; that the total number of cows tested for tuberculosis one or more times under this plan was 1,677,254, out of a total of twenty-seven million dairy cows in the United States; that there are 27,963 other herds on the waiting list; that 3,703 herds in Iowa and 4,039 herds in Minnesota have been tested.

I do not think that the growth of pasteurization since 1908 has been much more rapid, if any, than has its twin remedy for the protection of the public health, tuberculin testing, since Dyson introduced the herd accredited plan in 1912.

HOG CHOLERA ¹

By R. C. REED

University of Maryland, College Park, Md.

SINCE the losses from hog cholera in the United States are greater than all other losses in the hog industry, it does not seem out of place to discuss at this time some of the methods used for the control and eradication of this disease.

Much has been done to systematize methods, but more or less confusion still exists and the losses continue to mount up, in spite of the fact that many people believe that these losses have been reduced almost or quite to a minimum. Estimates made by the United States Department of Agriculture, from the best data available, place the actual loss of hogs from hog cholera, in the United States, at \$62,000,000. To this sum must be added the cost of serum, professional services for its administration, cleaning and disinfection, as well as the amounts spent by the Federal and State Governments in the systematic attempt to control the disease. This amount would be hard to reduce to figures, but probably is not less than \$20,000,000, and the amount may run far beyond this figure. This sum seems too great to charge against this industry annually, if our methods can in any way be improved. Year after year the fight continues, and we believe will continue, until the livestock owners and sanitarians can agree to employ the necessary measures not only to stop the spread of the infection but to destroy the virus. The methods too commonly employed tend to protect the individual owner temporarily without destroying the infection or preventing the spread of the disease to other herds.

Only by the prompt application of sanitary measures rigidly enforced can this spread be effectively checked. Sanitation does not mean simply cleaning and disinfection, both of which are absolutely essential, but also includes the use of all measures that can be applied for the promotion of health and the prevention of infection. Anything that keeps the animal up to the proper standard of vitality increases his resisting power to disease. Anything which tends to prevent the spread of the virus or the

¹ Presented at the fifty-eighth annual meeting of the American Veterinary Medical Association, Denver, Colo., September 5-9, 1921.

harboring of it on premises will reduce the spread of the disease. Needless to state, if we can destroy the virus we have solved the whole hog-cholera problem. The question, therefore, for us to discuss is how best to destroy this infectious organism. All attention has been given to control and not to eradication.

For over four years we have followed rather closely in Maryland a definite plan for the control and eventual eradication of hog cholera. Apparently our efforts have not been in vain. Up to this time our greatest results seem to be in confining the disease to the original center after the outbreak has been reported to us. It is interesting to state in passing that according to the statistics given out by the United States Department of Agriculture, Maryland ranks ninth in density of hog population per square mile in the United States. In per cent of loss from hog cholera per square mile she stands twenty-fifth.

In attempting to outline the Maryland plan for the eradication of hog cholera I can not do better than to quote more or less freely from an article published in one of the farm journals some time ago. Our work was started with an intensive educational campaign in every county in the State. This enlisted the interest and the hearty support of a majority of farmers and hog raisers in the work which we were attempting to do.

THE MARYLAND PLAN

"The Maryland Plan," briefly outlined, consists of three cardinal points, as follows:

1. Proper precautions to prevent the introduction and spread of the infection.
2. To prevent the maintenance of centers of infection by cleaning and disinfection.
3. The minimizing of losses and shortening of the duration of the disease in sick or exposed herds by vaccination.

A careful analysis of these three points will impress one with the fact that the problem which is of vital importance is the prevention of primary centers of infection or new outbreaks, for if primary centers are not established the various agencies known to be responsible for the spread of the virus can not disseminate it. A widespread outbreak, therefore, would be impossible. On the other hand, by whatever method the new

center of infection is established, the danger of the spread of the disease is the same.

Experience has shown that there are three principal ways by which hog cholera is introduced into free localities, viz.: (1) Garbage feeding; (2) introduction of new stock, especially stocker hogs; (3) abuse of the double treatment. Undoubtedly these practices are responsible for more than 95 per cent of new outbreaks.

GARBAGE FEEDING

Garbage feeding will be first considered, because in Maryland it appears to be responsible for more primary outbreaks than all other conditions. Of the primary outbreaks in the State during the year 1919, where it was possible to trace the source of infection, it was found that approximately 62 per cent of them were caused by the feeding of garbage. Canada considers it responsible for more than nine-tenths of their outbreaks.

The practice of feeding garbage was greatly stimulated by the abnormal prices for feed and pork incidental to the war. Officials encouraged its use as a food conservation measure, undoubtedly with the best intentions, but without foreseeing all the consequent danger. The desired results may or may not have been obtained. However, the time is past when the raising or feeding of hogs should be attempted under the conditions which impose an unnecessary risk of starting or maintaining centers of hog-cholera infection. This is especially true if it is expected to make hog raising safe from the ravages of hog cholera and the expense incidental thereto.

No attempt will be made at an exhaustive discussion of the merits of garbage disposal by reduction plants or by feeding to hogs. We have not been able to find data which show, from the standpoint of the taxpayer, the consumer or the feeder, that disposal of garbage by feeding to hogs has anything to recommend it over reduction. It is one of the surest methods of introducing hog-cholera infection. Uncooked garbage, as admitted by garbage feeding advocates, may contain the virus of hog cholera at any time.

It is believed that if the small gains usually obtained by feeding garbage were generally appreciated, few would bother with it, even though there were no danger from its use. It has been stated on good authority that, theoretically, under the best

conditions, one pound of pork may be obtained from 50 pounds of garbage. Practically, however, the ratio has been found to be nearer 70 to 80 pounds of garbage to one pound of pork. With pork selling at 14 cents a pound, and approximately 25 pounds being obtained from a ton of garbage, the value of the garbage would be about \$3.50 a ton. Now that the price of pork is materially lower, the feeding value of a ton of garbage is still further reduced.

The feeding of this product in certain sections of the country is largely responsible for the hog-cholera outbreaks. It may therefore be seen that garbage feeding has no advantage for the hog raiser or the feeder. Further, it is without doubt absolutely incompatible with sanitation.

Claims are often made that the double treatment can be administered to swine and these animals be safely fed garbage. For the sake of argument we will admit this claim, although reports received indicate it has never been possible to prevent unsatisfactory losses of hogs in garbage feeding plants. Even if the claim be true and none of the hogs should "break," it is nevertheless evident that if unsterilized garbage is constantly brought to the premises it would mean the maintenance of constantly infected premises.

It is obvious that no person or persons should be permitted to maintain a garbage-feeding plant in an agricultural community. Neither should it be permitted in any locality unless the necessary precautions are taken to prevent the premises from harboring hog-cholera infection.

NEW STOCK

In the primary infections which have occurred in Maryland during the last 18 months, and in which we have been able to trace the source, it has been found that about 30 per cent are due to the introduction of new stock. By this method susceptible swine which have been exposed to the infection, but have not yet developed the disease, as well as animals already infected and those from infected premises, are all capable of transmitting virus.

It appears inconceivable that any person would knowingly sell, for breeding or stocker purposes, hogs that had been exposed to or had developed cholera. At a public sale in the

spring of 1919 hogs were sold that carried infection to fourteen premises. There are also many who make a practice when sickness occurs among their hogs of shipping the small pigs to dealers with the idea that they will be resold before evidence of the disease appears. They either do not care or fail to realize that such action may cause a loss of thousands of dollars. Two years ago on a single farm in one county nearly 200 hogs were lost because of the purchase of such stock.

Hogs from infected premises, although they themselves may have been immunized, have been known to carry infection to free premises. But if the farmers or stock raisers purchasing hogs from outside of Maryland comply with the State regulations, there should be but little danger of cholera from this source. The State regulations are framed with the idea of giving the best possible protection. They are as follows:

All swine brought into this State for feeding, breeding or show purposes must be accompanied by a certificate of health issued by a veterinarian whose competency and reliability are attested by the authorities charged with the control of domestic animals in the State of export, stating that they are free from any symptoms of infectious or communicable diseases, and that such animals have been treated with proper doses of anti-hog-cholera serum within thirty (30) days of the date of entry into Maryland.

Swine that have received the simultaneous treatment must not be brought into Maryland for purposes other than immediate slaughter until a period of at least thirty (30) days has elapsed since the date of treatment. Such animals must be given an antiseptic bath as provided for in paragraph 9 of this regulation, and not again exposed to infection before being shipped.

These regulations should also govern the action of buyers when purchasing hogs within the State unless the animals are known to come from free territory. Hogs bought in a locality as to which the purchaser does not have full knowledge should be isolated for at least 30 days. If by that time they do not exhibit evidence of disease they may be safely placed with the other hogs on the premises after having been given an antiseptic bath.

For the past three years the two above described sources of infection have been responsible for practically all of the new outbreaks of hog cholera within the State of Maryland. Therefore we believe that if close supervision of the double treatment is continued, and the farmers and stock raisers will cooperate with the livestock sanitary authorities in preventing the intro-

duction of infection through these two sources, there will be but little danger from hog cholera.

ABUSE OF THE DOUBLE TREATMENT

Unmerited criticism has been directed at the Maryland State Board of Agriculture because it is alleged that this Board is committed to a "single treatment" policy. The fact is, however, that the Board has never adopted such a policy, although actual experience has demonstrated to the livestock sanitary officials that in most instances the single treatment is all that is needed.

The Maryland authorities are neither bound by the single-treatment policy, nor are they opposing the proper use of the double treatment. It is not the use but the *abuse* of the double treatment which is of great concern to this Board, and to that it is unalterably opposed. Anyone familiar with the double treatment does not question its merits as an immunizing agent. On the contrary, anyone equally familiar with it knows that by its abuse more harm than good will result.

The abuse of the double treatment is (a) its use in free territory; (b) its use in sick herds without proper diagnosis; (c) its administration by incompetent persons; (d) its administration without every precaution being taken to prevent the spread of the infection in case any of the animals should "break," and (e) where, by its use, centers of infection might be established.

(a) Double treatment enthusiasts and those opposed to its promiscuous use are practically agreed on one point; that is, the inadvisability of administering serum and virus to swine in free territories. All persons conversant with the double treatment know that many so-called "unexplainable breaks" will occur. Therefore it may be seen that if hogs in a free area are given the double treatment, and if any of them should "break," the infection would be introduced into a territory where it was previously unknown. In certain cases an exception might be made for the breeder of purebred hogs, whose lots are always open to visitors, and whose swine are exhibited at fairs. But such persons are usually so situated that they can completely isolate their stock; however, precautions must be taken to prevent spreading the disease or maintaining centers of infection.

(b) The administration of serum and virus to swine in sick

herds, if the condition be something other than cholera, is practically certain to produce an outbreak of the disease. Many times swine suffering from digestive trouble where diarrhea is present are thought to have cholera and are given the simultaneous treatment. As a result losses occur and the serum is usually blamed. Swine affected with any disease other than hog cholera, or which have been denied proper feed and care, have their vitality so lowered that they are less resistant to the virus and they are more certain to "break" than if they were healthy.

Many times double-treatment advocates appear to be of the opinion that there is no danger in giving the serum and virus to a sick herd. They argue that as hog cholera is present there is no danger of introducing an infection that is not already on the premises. This might be true if the sickness were hog cholera, but it would be a serious mistake if the condition proved to be something else.

To administer the double treatment to a sick herd before a positive diagnosis has been made (and a positive diagnosis can only be determined by a postmortem examination) is an abuse of this treatment. It may not only start a new center of infection but cause unnecessary losses, and it also has a tendency to make the farmers and stock raisers hesitate to employ vaccination when its use is really indicated.

(c) Determining just what constitutes competency in the administration of the double treatment might lead to endless discussion. If it only concerned the injection of the serum and virus it would be an easy problem to solve, as this procedure may be taught to any careful person in the course of a few minutes. The problems surrounding its administration are so varied and complex that an individual to be competent must fully understand the products which he is using. He should be able to determine when the treatment should or should not be administered. He should be capable of making a proper diagnosis and be able to determine whether or not the swine are in condition to receive the treatment. He must also be experienced in estimating weight of hogs and in determining dosage.

(d) All possible precaution should be taken to prevent the spread of the infection in case animals "break" as a result of the administration of the double treatment. If it were possible

to administer this treatment so that there would be no "breaks" it would be unnecessary to use so many precautions to prevent the spread of the infection. But it is impossible to determine, at the time of injection, whether or not any of the animals will develop hog cholera as a result of the treatment.

The claims of the double treatment advocates to the effect that the number of animals in a herd which develop the disease as a result of the treatment is usually very small may generally be accepted. However, at times the losses are most discouraging. But if only one animal in the herd "breaks" as a result of the treatment, a center of hog-cholera infection is established just as surely as if the disease had been contracted in some other manner. Further, it is just as possible for the infection to be carried from the premises as it would be if the whole herd had developed the disease.

A short time ago a herd of purebred swine in this State was given the double treatment. As a result of the treatment one of the animals developed hog cholera. After the serum and virus had been administered, but before this hog "broke" with the disease, a number of sows farrowed, and they with their young pigs were put in pens adjoining the double-treated hogs. The infection spread to these young pigs and there was a discouraging and unnecessary loss as a result of this negligence.

(c) The maintenance of infected premises by the use of the double treatment. It is not generally appreciated that infected premises may be as much or even more of a menace than sick herds. However, experience has proved this to be a fact in many instances. Numerous outbreaks have occurred which were caused directly or indirectly by infected premises. When there are sick hogs on a given place, the neighbors will ordinarily use more or less care to prevent the spread of the infection. After the animals have all died or recovered, as the case may be, these same neighbors are apt to forget that the infection may still be harbored on the premises. From here it may be spread and start new outbreaks on other farms and may also infect hogs bought to replace those on the first farm.

A careful analysis of the subject shows that apparently one of the greatest dangers arising from the use of the double treatment is that it causes a feeling of security and creates a tendency to discourage cleaning and disinfection.

The regulations of the State Board of Agriculture governing the use of the double treatment prescribe that if it is desired to administer this treatment the swine owner shall make application to the Livestock Sanitary Section of the Board for a permit to use it. By signing this application the owner agrees to have the treatment administered by a registered graduate veterinarian (giving the name of the veterinarian), that the animals under treatment shall be isolated for at least thirty days, at the end of which time that portion of the premises on which the hogs were confined shall be cleaned and disinfected and the animals dipped in an approved disinfecting solution.

Experience has proved that in Maryland there are two main causes for the spread of hog-cholera infection in case an outbreak is started in a neighborhood. They are, first, failure to give warning of the outbreak; second, failure on the part of the owner to dispose promptly and properly of the carcasses of hogs that die.

One of the reasons why people do not give warning when their hogs are suffering from cholera is that they feel it is a disgrace and therefore try to conceal the fact. If they would only look at it in the proper light they could easily see that the real disgrace is in not reporting it. If a person's hogs have cholera would it be a disgrace for him to notify the authorities and neighbors so that they might take the proper steps to prevent the spread of the infection? Does not the disgrace lie in trying to conceal the matter? Because of lack of this information neighbors and others do not take the proper precaution, and the infection is carried to their hogs, causing unnecessary loss.

In order to prevent the spread of infection, all illness among swine should be considered hog cholera until proven otherwise. This will entail practically no extra expense. Then should the infection prove to be hog cholera, there will be slight danger of its spread. On the other hand should the disease prove to be something other than cholera, the self-imposed quarantine will have caused no material hardship.

One of the greatest dangers of the spread of hog-cholera infection from the primary outbreak is the failure to dispose promptly and properly of the carcasses of hogs that have died of the disease. In fact, it is believed that in the past this has

been responsible for more secondary outbreaks than all other conditions combined. The Maryland law, as quoted below, is most explicit. Farmers and stock raisers will give great protection not only to their own animals but to the swine industry at large by its strict observance.

All hogs and other domestic animals dying of contagious or infectious disease shall be buried at a depth of at least three (3) feet, or be burned, at the discretion of the owner. And any person or persons permitting any dead hogs or any other domestic animal, having died of any contagious disease, to remain unburied upon his or her premises for the space of three hours prior to sunset of said day after he has discovered same, shall be guilty of a misdemeanor, and upon conviction thereof before any justice of the peace shall be fined not less than ten (\$10.00) dollars for each offense or imprisoned in the county jail for not less than ten (10) days, or be both fined and imprisoned in the discretion of the justice.

In many instances careless and indifferent persons, in absolute disregard of the safety of their neighbors' stock, have neglected to comply with this law. They take advantage of the fact that it specifies that only animals dying of contagious or infectious diseases should be so disposed of. They either profess ignorance as to the cause of the death of their hogs or ascribe it to some condition other than a contagious or infectious disease. To stop such evasion of the law, the State Board of Agriculture adopted the following regulation, which makes it imperative that carcasses of all animals having died of any cause must be properly disposed of:

As the practice of allowing dead animals to remain unburied is a menace to the health of the livestock of the community, and frequent cause of disease, it is hereby required that horses, asses, cattle, swine or other domestic animals, having died from any cause, be burned or buried at a depth of at least three feet, or sent to some establishment where dead animals are disposed of in a manner to prevent their becoming a menace.

Too much emphasis can not be put upon the fact that it is absolutely essential for farmers and stock raisers to assist the authorities in seeing that these requirements are complied with. Prompt notice with confirming evidence of violation of these regulations should be given the livestock sanitary officials.

It is incumbent upon the owner of a sick herd to take the necessary precautions to prevent the spread of the infection from his premises. Equal responsibility, however, rests on the owner of the hogs which have not been exposed to the infection. The owner of the sick herd might comply with every

regulation to prevent the spread of infection, yet people with well herds could undo much of his good work by carelessness.

There is no doubt that the danger of infected premises is much underestimated. Data gathered from the work in Maryland show these conditions to have been responsible for many outbreaks of hog cholera. Just what constitutes cleaning and disinfection of premises seems to be misunderstood by many farmers and stock raisers. They appear to dread the task and in a large per cent of instances they prefer to adopt the more expensive method of immunization. They forget that by this procedure they are perpetuating a menace for their swine, when by proper cleaning and disinfection they would remove this and in addition would undoubtedly improve the condition of their hogs.

We do not question the value of the serum treatment, or even the serum-virus treatment when properly applied, in the minimizing of losses, shortening of the duration of the disease in sick or exposed herds; but too much dependence has often been put upon the serum treatment, which is not, and never has been, advocated as a cure.

Our work in Maryland has been carried on entirely in co-operation with the Division of Hog Cholera Control of the United States Bureau of Animal Industry, and our results have been satisfactory when compared with the methods employed in other States. The cost has been nominal.

In each case reported to us we attempt first of all to make a definite diagnosis, and if the disease proves to be hog cholera measures are taken to stop the spread of the disease by a voluntary quarantine and by notifying neighbors and giving them definite instruction regarding the prevention and control of hog cholera. One of the greatest drawbacks to our work is the late reporting of outbreaks. If information of the sickness reaches us promptly the number of secondary outbreaks is reduced to a minimum.

Finally, the "Maryland Plan," when boiled down, is the prevention of the introduction, harboring and spread of the hog-cholera virus.

BOTULISM IN ITS RELATION TO ANTI-HOG-CHOLERA SERUM AND HOG-CHOLERA VIRUS

By EDW. A. CAHILL, H. W. JAKEMAN and T. W. MUNCE

Indianapolis, Indiana

THE SUBJECT of botulism in swine has until recently been limited to an occasional reference to the isolation of *Bacillus botulinus* from that species, usually from the feces. More recently Graham (1) reported the presence of *B. botulinus* Type A in the tissues of a number of swine and described sporadic and enzootic conditions which he called botulism. Graham's work was inaugurated on account of increased losses in swine both previous and subsequent to hog-cholera immunization. Several conclusions offered by him regarding the present status of swine diseases differ radically from the findings of other investigators and are as yet unsupported by published data. Of special interest are two points raised by Graham. The first is that there exists in swine a previously unrecognized disease—botulism—while the second is that a large percentage of commercial anti-hog-cholera serum and hog-cholera virus is contaminated with *B. botulinus*. This latter assertion is of particular interest, since hog cholera is the most serious disease of swine and the products named are the only two which are capable of immunizing animals against that disease.

The use of these products in the immunization of swine against cholera and public confidence in their efficacy are responsible for materially reducing both the number of susceptible animals and the losses from the disease. Loss of confidence in products capable of producing such immunity would naturally result in the immunization of fewer animals, which would cause an increase both in the number of susceptible swine and the losses from disease. Conversely, if it were proven that these products may be contaminated, either with *B. botulinus* or with its toxin, this would constitute a menace equally as great, since there would then be presented the possibility of one disease being caused by products intended for the prevention of another. Since the public is vitally concerned in the results following the use of these products, and since erroneous conclu-

sions may cause irreparable damage, there are required confirmed data and experiments rather than an expression of opinion.

With these points in mind the writers have undertaken to appraise the correctness of Graham's conclusions. Points for consideration have been taken up in the order of their practical importance.

The first experiment was conducted with four samples of anti-hog-cholera serum and one sample of virus. These were samples of serial lots (although different bottles) which had been examined by Graham (1) and included in the 16 per cent which he found contaminated. All were examined for the presence of botulinus toxin as described in Table 1. The completely negative results are particularly striking when it is realized that large amounts of supposedly toxic material were used.

Each sample of serum was next submitted to cultural and additional toxicity tests, with negative results, as shown in Table 2. When these cultures were injected into mice and guinea-pigs there was no evidence of toxin production. Samples of the material under test had been submitted to two recognized authorities on botulism, and their findings were in exact conformity with those given in Table 1 and Table 2.

Since there now remained only a small quantity of each lot of serum being tested, these were mixed and the composite sample tested for its toxicity for swine, as shown in Table 3. Botulinus antitoxin was used on two pigs to compare animals so treated with those which were expected to sicken as a result of receiving supposedly toxic material. Pig No. 9242, apparently affected with cholera, died on the tenth day after inoculation. The possibility of botulism in this animal is precluded by the fact that it had received 1,500 units of botulinus antitoxin (Type A).

During the past three years the writers have conducted and observed over 1,700 tests to determine the possible presence of toxin in anti-hog-cholera serum and hog-cholera virus. Each test represented a serial lot of serum or virus and was conducted by inoculating guinea-pigs and mice with 3 c.c. and 0.5 c.c. respectively of the product under test. Notwithstanding the

TABLE 1.—TOXICITY TEST OF HOG-CHOLERA SERUM AND VIRUS FOR BOTULINUS TOXIN.

Animal	No.	Material Injected ¹	Method of Injection ¹	Amount Injected (c.c.)	Observations				Remarks
					42 Hours	48 Hours	72 Hours	96 Hours	
Guinea-pig	4016	Sim virus A	S. C.	3	O. K.	O. K.	O. K.	O. K.	Cage control.
	4017	do.	do.	3	do.	do.	do.	do.	
	4018	do.	do.	3	do.	do.	do.	do.	
	4019	do.	do.	0.5	do.	do.	do.	do.	
	4020	Sim virus A	I. P.	0.5	do.	do.	do.	do.	
	4021	do.	do.	0.5	do.	do.	do.	do.	
	4022	do.	do.	0.5	do.	do.	do.	do.	
White Mouse	4023	do.	do.	0.5	do.	do.	do.	do.	Cage control.
	4024	do.	do.	0.5	do.	do.	do.	do.	
	4025	do.	do.	0.5	do.	do.	do.	do.	
	4026	do.	do.	0.5	do.	do.	do.	do.	
	4027	do.	do.	0.5	do.	do.	do.	do.	
	4028	do.	do.	0.5	do.	do.	do.	do.	
	4029	do.	do.	0.5	do.	do.	do.	do.	
Guinea-pig	3798	H. C. S. A	S. C.	3	O. K.	O. K.	O. K.	O. K.	Cage control.
	3799	do.	do.	3	do.	do.	do.	do.	
	3800	do.	do.	0.5	do.	do.	do.	do.	
	3801	H. C. S. A	I. P.	0.5	do.	do.	do.	do.	
	3802	do.	do.	0.5	do.	do.	do.	do.	
	3803	do.	do.	0.5	do.	do.	do.	do.	
	3804	do.	do.	0.5	do.	do.	do.	do.	
White Mouse	3805	do.	do.	0.5	do.	do.	do.	do.	Cage control.
	3806	do.	do.	0.5	do.	do.	do.	do.	
	3807	do.	do.	0.5	do.	do.	do.	do.	
	3808	do.	do.	0.5	do.	do.	do.	do.	
	3809	do.	do.	0.5	do.	do.	do.	do.	
	3810	do.	do.	0.5	do.	do.	do.	do.	
	3811	do.	do.	0.5	do.	do.	do.	do.	
Guinea-pig	3812	H. C. S. B	S. C.	3	O. K.	O. K.	O. K.	O. K.	Cage control.
	3813	do.	do.	3	do.	do.	do.	do.	
	3814	do.	do.	0.5	do.	do.	do.	do.	
	3815	do.	do.	0.5	do.	do.	do.	do.	
	3816	do.	do.	0.5	do.	do.	do.	do.	
	3817	H. C. S. B	I. P.	0.5	do.	do.	do.	do.	
	3818	do.	do.	0.5	do.	do.	do.	do.	
White mouse	3819	do.	do.	0.5	do.	do.	do.	do.	Cage control.
	3820	do.	do.	0.5	do.	do.	do.	do.	
	3821	do.	do.	0.5	do.	do.	do.	do.	
	3822	H. C. S. C	S. C.	3	O. K.	O. K.	O. K.	O. K.	
	3823	do.	do.	3	do.	do.	do.	do.	
	3824	do.	do.	0.5	do.	do.	do.	do.	
	3825	H. C. S. C	I. P.	0.5	do.	do.	do.	do.	
Guinea-pig	3826	do.	do.	0.5	do.	do.	do.	do.	Cage control.
	3827	do.	do.	0.5	do.	do.	do.	do.	
	3828	do.	do.	0.5	do.	do.	do.	do.	
	3829	do.	do.	0.5	do.	do.	do.	do.	
	3830	do.	do.	0.5	do.	do.	do.	do.	
	3831	do.	do.	0.5	do.	do.	do.	do.	
	3832	do.	do.	0.5	do.	do.	do.	do.	
White mouse	3833	do.	do.	0.5	do.	do.	do.	do.	Cage control.
	3834	do.	do.	0.5	do.	do.	do.	do.	
	3835	do.	do.	0.5	do.	do.	do.	do.	
	3836	do.	do.	0.5	do.	do.	do.	do.	
	3837	do.	do.	0.5	do.	do.	do.	do.	
	3838	do.	do.	0.5	do.	do.	do.	do.	
	3839	do.	do.	0.5	do.	do.	do.	do.	
Guinea-pig	3840	H. C. S. D	S. C.	3	O. K.	O. K.	O. K.	O. K.	Autopsy, septicaemia.
	3841	do.	do.	3	do.	do.	do.	do.	
	3842	do.	do.	0.5	do.	do.	do.	do.	
	3843	H. C. S. D	I. P.	0.5	do.	do.	do.	do.	
	3844	do.	do.	0.5	do.	do.	do.	do.	
	3845	do.	do.	0.5	do.	do.	do.	do.	
	3846	do.	do.	0.5	do.	do.	do.	do.	

¹Key to abbreviations: "Sim," simultaneous; "H. C. S.," hog-cholera serum; "S. C.," subcutaneous; "I. P.," intraperitoneal.

TABLE 2.—BACTERIOLOGICAL EXAMINATION OF ANTI-HOG-CHOLERA SERUM FOR *BACILLUS BOTULINUS*.

Material, serum from original unopened containers. Injection of guinea-pigs with 0.3 cc. 2 weeks old cultures, subcutaneously, one guinea-pig to each culture.

Anti-Hog-Cholera Serum	Guinea-pig Inoculations	Aerobic Growth on Agar	Anaerobic Growth			Glucose Broth Duplicate	Meat Medium	Meat Medium Duplicate
			Glucose Bouillon	Glucose Agar	Meat Medium			
Sample A. Bottle 1..... Bottle 2.....	O.K., 120 hours do.	— —	— —	— —	— —	O.K., 120 hours do.	O.K., 120 hours do.	O.K., 120 hours do.
Sample B. Bottle 1..... Bottle 2.....	O.K., 120 hours do.	— +	— —	— —	— —	O.K., 120 hours do.	O.K., 120 hours do.	O.K., 120 hours do.
Sample C. Bottle 1..... Bottle 2.....	O.K., 120 hours do.	— —	— —	— —	— —	O.K., 120 hours do.	O.K., 120 hours do.	O.K., 120 hours do.
Sample D. Bottle 1..... Bottle 2.....	O.K., 120 hours do.	— —	— —	— —	— —	O.K., 120 hours do.	O.K., 120 hours do.	O.K., 120 hours do.

TABLE 3. TESTS ON COMPOSITE SAMPLE OF HOG-CHOLERA SERUM FOR TOXICITY FOR SWINE.

Date Inoculated	Tag No.	Weight (Pounds)	Serum Injected (c.c.) ¹	Amount of Botulins (Type A) Antitoxin (Units)	Amount of Botulins (Type A) Antitoxin (Units)	Temp erature of Day Inoculated	Observations and temperatures. ³																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
							6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
1921 Nov. 5	9216	100	35		3	101.0		2	0	2	4	3	0	2	1	0	3	6																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												</

¹Composite sample of hog-cholera serums A, B, C and D.

²The virulence of the virus used was established by inoculation of several hundreds of virus pigs.

³Temperature shown in first line in each case; figures for hundred omitted (a, g., 2.0 = 102.0). Condition shown in second line in each case.

X = healthy; S = visibly sick.

⁴Sunday.

⁵Holiday.

⁶Died Nov. 15; lesions of cholera.

large amount of injected material, the findings have never indicated the presence of toxin. These tests have been conducted at a time sufficiently long after production to allow for the detection of botulinus toxin if present. Notwithstanding this it was felt, in view of Graham's statement (1) that more than 16 per cent of commercial anti-hog-cholera serum and hog-cholera virus "is contaminated with toxigenic strains" of *B. botulinus*, that a large number of aged samples should be re-examined both culturally and for toxicity.

Bengston (2), Orr (3) and others have shown that 0.0001 c.c. of botulinus toxin is a lethal dose for a 250-gram guinea-pig. Orr (4) has shown that mice are extremely susceptible to the same dose, while if this be increased to 0.1 c.c. death occurs in approximately four hours. It was, therefore, felt that an intraperitoneal injection of 0.5 c.c. would be an overwhelming dose if toxin were present in the products under test. One hundred and twenty-five serial lots of anti-hog-cholera serum and nine serial lots of virus were tested in this manner. The results were entirely negative, as shown in Table 4. White mice were used in inoculating the serum and guinea-pigs were used in the case of the virus. All mice were injected intraperitoneally with 0.5 c.c. and all guinea-pigs subcutaneously with 3 c.c. of the phenolized commercial product. Since the oldest samples in the test had been produced two years and ten days and the freshest five months previously, it was felt that the material should be quite toxic if toxigenic strains of *B. botulinus* were present. Mice inoculated with samples 3 and 42 died from causes other than the material injected. The table shows a repetition of the tests on these lots with satisfactory results.

Although these results strongly indicated the absence of botulinus toxin in the material under test, it was felt advisable that the investigations be carried further. Accordingly these same serial lots were then tested by planting 10 c.c. of each sample in 50 c.c. of medium known to be particularly favorable to toxin production. The medium used consisted of equal parts of minced beef and water which was definitely alkaline (pH 8.0). This is a modification of the Muriel Robertson (5) medium and has proven most valuable for the production of

botulinus and other toxins. The cultures were observed on the second, fourth, seventh and seventeenth days for gas formation and the odor ordinarily associated with *B. botulinus*. Particular attention was given to the examination for odor both in the newly opened bottle used for planting and inoculating and in the periodic cultural examinations. DeBord (6) states that all material examined by the United States Bureau of Chemistry and found to contain *B. botulinus* or its toxin had a distinctly offensive characteristic odor. Practically all investigators refer to the disagreeable, rancid odor possessed by material in which *B. botulinus* is growing, and no data were available to indicate that anti-hog-cholera serum or virus would be exceptions to this general rule. After seventeen days, white mice were inoculated with these cultures, using 0.3 c.c. of each sample subcutaneously. An accident in one of the cages was responsible for the death of several animals. In these cases the samples were reinoculated with satisfactory results. The results are tabulated in Table 4.

Since the experiments outlined in Table 4 indicate the absence of *B. botulinus* and its toxin in samples representing over 12,000,000 c.c. of anti-hog-cholera serum and nearly 200,000 c.c. of virus, it would seem that the possibility of botulism being caused by these products is remote.

Elder and Pischel (7), Burke (8), Dickson (9) and many others have shown that *B. botulinus* or its spores are incapable of causing botulism when ingested or otherwise gaining entrance to the body unless associated with preformed toxin. These observers believe the organism to be a saprophyte incapable of causing disease unless its toxin is formed outside the body. Thom, Edmondson and Giltner (10) and more recently Orr (11) have shown that, when massive quantities of spores are administered to guinea-pigs subcutaneously or per os, botulism may develop. Although the exact status of this problem remains unsettled, it was deemed advisable to determine whether or not anti-hog-cholera serum or virus artificially contaminated with *B. botulinus* would contain a preformed toxin capable of causing botulism, or whether swine inoculated with a spore-serum mixture would develop botulism as occurred in Orr's experiments with guinea-pigs. To determine this point spores were prepared

TABLE 4.—INOCULATION TESTS OF HOG-CHOLERA SERUM AND VIRUS FOR BOTULINUS TOXIN.—Continued.

Animal Inoculations with Hog-Cholera Serum and Virus. ¹			Anaerobic Growth on meat medium		Animal Inoculations with 0.3 c.c. 17-day-old meat medium cultures, subcutaneously		Reinoculations	
Material	Animal ²	Results	Gas	Rancid Odor	Animal ²	Results	Animal ²	Results
Serum 1	WM 3912	O. K., 120 hours	—	—	WM 4282	O. K., 72 hours		
2	3931	do.	—	—	4308	do.		
3	3914	Dead, 96 hours ³	—	—	4348	do.		
4	3915	O. K., 120 hours	—	—	4301	do.		
5	3916	do.	—	—	4343	do.		
6	3917	do.	+	—	4354	do.		
7	3918	do.	—	—	4272	do.		
8	3919	do.	—	—	4358	Dead, 48 hours	WM 4407	O. K., 72 hours
9	3920	do.	—	—	4263	O. K., 72 hours		
10	3921	do.	—	—	4350	do.		
11	3922	do.	—	—	4332	do.		
12	3923	do.	—	—	4285	do.		
13	3924	do.	—	—	4286	do.		
14	3925	do.	—	—	4257	do.		
15	3926	do.	—	—	4276	do.		
16	3927	do.	—	—	4309	Dead, 48 hours		
17	3928	do.	—	—	4306	O. K., 72 hours	WM 4432	O. K., 72 hours
18	3929	do.	—	—	4339	do.		
19	3930	do.	—	—	4264	do.		
20	3931	do.	—	—	4389	do.		
21	3932	do.	—	—	4361	do.		
22	3933	do.	—	+	4328	do.		
23	3934	do.	—	—	4277	do.		
24	3935	do.	—	—	4376	Dead, 24 hours	WM 4404	O. K., 72 hours
25	3936	do.	—	—	4312	do.	WM 4426	do.
26	3937	do.	—	—	4213	O. K., 72 hours		
27	3938	do.	—	—	4380	do.		
28	3939	do.	—	—	4335	do.		
29	3940	do.	—	—	4258	do.		
30	3941	do.	—	—	4371	do.		
31	3942	do.	—	—	4274	Dead, 24 hours	WM 4410	O. K., 72 hours
32	3943	do.	—	—	4386	do.	WM 4428	do.
33	3944	do.	—	—	4265	O. K., 72 hours		
34	3945	do.	—	—	4372	Dead, 12 hours	WM 4401	O. K., 72 hours
35	3946	do.	—	—	4374	O. K., 72 hours		
36	3947	do.	—	—	4321	Dead, 24 hours	WM 4400	O. K., 72 hours
37	3948	do.	—	—	4363	do.	WM 4430	do.
38	3850	do.	—	—	4392	O. K., 72 hours		
39	3950	do.	—	—	4388	do.		
40	3951	do.	—	—	4296	do.		
41	1810	do.	—	—	4303	do.		
42	3953	do.	—	—	4290	do.		
43	3954	O. K., 120 hours	—	—	4298	Dead, 48 hours	WM 4408	O. K., 72 hours
44	3955	do.	—	—	4295	O. K., 72 hours		
45	3956	do.	—	—	4341	do.		
46	3957	do.	—	—	4271	do.		
47	3958	do.	—	—	4326	do.		

TABLE 4.—INOCULATION TESTS OF HOG-CHOLERA SERUM AND VIRUS FOR BOTULINUS TOXIN.—Continued.

Animal Inoculations with Hog-Cholera Serum and Virus. ¹			Anaerobic Growth on meat medium		Animal Inoculations with 0.3 c.c. 17-day-old meat medium cultures, subcutaneously		Reinoculations	
Material	Animal?	Results	Gas	Puacid Odor	Animal?	Results	Animal?	Results
48	3959	do.	—	—	4283	do.		
49	1841	do.	—	—	4357	do.		
50	3961	do.	—	—	4365	do.		
51	3962	do.	—	—	4292	do.		
52	3963	do.	—	—	4366	do.		
53	3964	do.	+	—	4356	do.		
54	3965	do.	—	—	4363	do.		
55	3966	do.	—	—	4293	do.		
56	3967	do.	—	—	4262	do.		
57	3968	do.	—	—	4378	Dead, 48 hours	WM 4425	O.K., 72 hours
58	3969	do.	—	—	4314	O.K., 72 hours		
59	3970	do.	—	—	4383	do.		
60	3971	do.	—	—	4319	do.		
61	3972	do.	—	—	4342	do.		
62	3973	do.	—	—	4260	do.		
63	3974	do.	—	—	4387	do.		
64	3975	do.	—	—	4316	do.		
65	3976	do.	—	—	4288	do.		
66	3977	do.	—	—	4346	do.		
67	3978	do.	—	—	4352	do.		
68	3979	do.	—	—	4284	do.		
69	3987	do.	—	—	4266	Dead, 48 hours	WM 4420	O.K., 72 hours
70	3988	do.	—	—	4268	O.K., 72 hours		
71	9390	do.	—	—	4253	do.		
72	3993	do.	—	—	4267	do.		
73	3995	do.	—	—	4335	do.		
74	3996	do.	—	—	4336	Dead, 48 hours	WM 4402	O.K., 72 hours
75	3997	do.	—	—	4307	O.K., 72 hours	WM 4431	O.K., 72 hours
76	3998	do.	—	—	4304	Dead, 24 hours	WM 4403	do.
77	3999	do.	—	—	4359	Dead, 12 hours		
78	1001	do.	—	—	4287	O.K., 72 hours		
79	1005	do.	—	—	4299	do.		
80	1010	do.	—	—	4310	do.		
81	1011	do.	—	—	4329	Dead, 48 hours	WM 4437	O.K., 72 hours
82	1028	do.	—	—	4349	O.K., 72 hours		
83	4030	do.	—	—	4320	do.		
84	4032	do.	—	—	4362	do.		
85	4038	do.	—	—	4278	do.		
86	4040	do.	—	—	4338	do.		
87	4042	do.	—	—	4311	Dead, 48 hours	WM 4422	O.K., 72 hours
88	4016	do.	—	—	4334	O.K., 72 hours		
89	1018	do.	—	—	4375	do.		
90	4050	do.	—	—	4327	do.		
91	4052	do.	—	—	4344	Dead, 48 hours	WM 4421	O.K., 72 hours
92	4056	do.	—	—	4393	O.K., 72 hours		
93	4058	do.	—	—	4307	do.		
94	4060	do.	—	—	4300	do.		

TABLE 4.—INOCULATION TESTS OF HOG-CHOLERA SERUM AND VIRUS FOR BOTULINUS TOXIN.—Continued.

Animal Inoculations with Hog-Cholera Serum and Virus. ¹			Anaerobic Growth on meat medium		Animal Inoculations with 0.3 c.c. 17-day-old meat medium cultures, subcutaneously		Reinoculations	
Material	Animal ²	Results	Gas	Rancid Odor	Animal ²	Results	Animal ²	Results
95.	4062	do.	—	—	4373	do.		
96.	4068	do.	—	—	4351	do.		
97.	4070	do.	—	—	4300	do.		
98.	4072	do.	—	—	4322	do.		
99.	1775	do.	—	—	4317	do.		
100.	1776	do.	—	—	4340	Dead, 24 hours	WM 4411	O.K., 72 hours
101.	1777	do.	—	—	4370	O.K., 72 hours	WM 4440	O.K., 72 hours
102.	1778	do.	—	—	4367	Dead, 12 hours	WM 4294	do.
103.	1779	do.	—	—	4281	Dead, 48 hours	WM 4399	do.
104.	1780	do.	—	—	4291	O.K., 72 hours		
105.	1781	do.	—	—	4230	do.		
106.	1782	do.	—	—	4353	do.		
107.	1783	do.	—	—	4357	do.		
108.	1811	do.	—	—	4366	Dead, 48 hours	WM 4424	O.K., 72 hours
109.	1812	do.	—	—	4280	O.K., 72 hours		
110.	1813	do.	—	—	4345	do.		
111.	1814	do.	—	—	4269	Dead, 48 hours	WM 4434	O.K., 72 hours
112.	1815	do.	—	—	4330	O.K., 72 hours		
113.	1816	do.	—	—	4302	do.		
114.	1817	do.	—	—	4333	Dead, 48 hours	WM 4407	O.K., 72 hours
115.	1818	do.	—	—	4391	O.K., 72 hours		
116.	1819	do.	—	—	4289	do.		
117.	1820	do.	—	—	4377	do.		
118.	1821	do.	—	—	4379	do.		
119.	1822	do.	—	—	4331	Dead, 48 hours	WM 4416	O.K., 72 hours
120.	1826	do.	—	—	4364	O.K., 72 hours	WM 4427	O.K., 72 hours
121.	1827	do.	—	—	4347	Dead, 48 hours	WM 4408	do.
122.	1828	do.	—	—	4323	do.		
123.	1830	do.	—	—	4381	O.K., 72 hours		
124.	1831	do.	—	—	4720	do.		
125.	1839	do.	—	—				
126.	4066	do.	—	—				
127.	4015	do.	—	—				
128.	4188	do.	—	—	WM 4384	O.K., 72 hours		
Virus 1	G.P.	do.	—	—	4313	do.		
2		do.	—	—	4318	do.		
3		do.	—	—	4368	do.		
4	4190	do.	—	—	4315	do.		
5	4191	do.	—	—	4355	do.		
6	4192	do.	—	—	4325	Dead, 48 hours	WM 4414	O.K., 72 hours
7	4196	do.	—	—	4362	O.K., 72 hours		
8	4197	do.	+	—	4275	do.		
9	4198	do.	—	—	4261	Dead, 48 hours	WM 4413	O.K. 72 hours
Medium Control	4199	do.	—	—				

¹For white mice, 0.5 c.c. intraperitoneally; for guinea-pigs, 3 c.c. subcutaneously.²WM=white mice; GP=guinea-pig.³See reinoculation of this sample near bottom of table.⁴Reinoculation of sample after death of first animal.

by planting two toxigenic strains of *B. botulinus* (Type A) in glucose bouillon, and after seventeen days' contact the cultures were heated to destroy the toxin and guinea-pigs were inoculated.

As will be seen in Table 5 one guinea-pig died on the fifth and one on the sixth day, presumably as a result of toxin formed within the body. This is in accord with the recent work of Orr (11), since, if toxin were contained in the injected material, death would have followed in a few hours.

TABLE 5.—INOCULATIONS WITH HEATED BOTULINUS CULTURES.

Guinea-pig No.	Date Inoculated	Material	Results
4076.....	Nov. 25, 1921	1 c.c. of heated bouillon culture	Died, 5 days
4077.....	do.	do.	do.

The heated suspension was cultured in minced meat medium to make certain that the spores had not been destroyed. All cultures showed profuse growth of *B. botulinus* in two days. That the toxin-producing ability of the spores had not been destroyed was proven by animal inoculations shown in Table 6.

TABLE 6.—INOCULATIONS WITH BOTULINUS CULTURES FROM HEATED SUSPENSION.

Material	Date Heated and Cultured	Guinea-Pig No.	Date of Inoculation	Amount Inoculated	How Inoculated	Results
Bouillon cultures from heated suspension shown in Table 5.....	Nov. 25, 1921	4204	Dec. 21, 1921	0.2 c.c.	Subcutaneously	Dead, 5 hours
	do.	4205	do.	do.	do.	do.

Four bottles of phenolized anti-hog-cholera serum were inoculated with this toxin-free spore suspension which had been proven viable and toxigenic. Two bottles were inoculated with 0.1 c.c. and two with 0.5 c.c. of the spore suspension, and all were allowed to stand at room temperature for fifteen days, after which guinea-pigs were inoculated. All animals received 0.5 c.c. subcutaneously, two receiving 18 million spores and two 90 million, respectively, depending upon the bottles from which they were inoculated. The two which received 90 million died in six days, while those receiving 18 million died in seventeen days, which again indicates that toxin was formed within the body. These results, confirming as they do those which are

TABLE 7.—INOCULATION OF SWINE WITH MIXTURE OF ANTI-HOG-CHOLERA SERUM AND BOTULINUS SPORES.

(Each animal inoculated with 25 c.c. of the serum-spore mixture containing approximately 130 million spores per c.c., and with 2 c.c. of hog-cholera virus, the virulence of which was established by the inoculation of several hundred pigs for the production of hog-cholera virus.)

Pig No.	Weight (Pounds)	Tempera- ture Day inoculated	Observations and Temperatures ¹																		
			1	2	3	4	5 ²	6 ³	7	8	9	10	11	12 ²	13 ³	14	15	16	17	18	19
2995.....	44	100.0	2.4	2.6	1.6	2.6	.....	.....	2.0	2.2	1.8	1.8	2.0	.....	.....	2.0	2.0	2.0	2.0	2.2	2.0
			X	X	X	X	.....	.....	X	X	X	X	X	.....	.....	X	X	X	X	X	X
2996.....	38	100.8	3.6	2.0	2.0	2.2	.....	.....	2.6	1.8	2.0	2.0	2.2	.....	.....	2.2	2.0	2.6	2.2	2.6	2.4
			X	X	X	X	.....	.....	X	X	X	X	X	.....	.....	X	X	X	X	X	X
2997.....	43	101.4	3.6	2.4	2.6	3.8	.....	.....	2.6	2.0	2.2	2.2	1.8	.....	.....	1.8	3.4	2.0	2.6	2.0	2.2
			X	X	X	X	.....	.....	X	X	X	X	X	.....	.....	X	X	X	X	X	X
2998.....	35	101.6	1.0	3.2	1.8	2.6	.....	.....	2.0	2.0	1.6	2.0	2.0	.....	.....	2.0	2.2	1.8	2.6	2.0	2.2
			X	X	X	X	.....	.....	X	X	X	X	X	.....	.....	X	X	X	X	X	X
2999.....	28	100.4	2.6	3.0	2.6	3.0	.....	.....	1.8	2.0	2.0	2.0	2.2	.....	.....	2.0	2.4	2.0	2.2	2.4	2.4
			X	X	X	X	.....	.....	X	X	X	X	X	.....	.....	X	X	X	X	X	X
3000.....	38	101.8	3.2	2.0	2.6	2.6	.....	.....	2.0	1.6	2.0	2.2	2.4	.....	.....	2.6	2.6	2.4	2.0	2.6	2.0
			X	X	X	X	.....	.....	X	X	X	X	X	.....	.....	X	X	X	X	X	X

¹Numerals in first row below heading indicate number of days after inoculation. Figures for hundred omitted from temperatures (e. g., 2.4=102.4). X=healthy.

²Sunday.

³Holiday.

presented in Table 5, apparently indicate that botulinus toxin is not produced in phenolized anti-hog-cholera serum, since, had toxin been present, the guinea-pigs should have died a few hours subsequent to injection.

In view of these findings, which agree with those of Orr (11) and others that massive doses of spores may result in the death of guinea-pigs, it was deemed necessary to determine if similar results might occur in swine. Accordingly swine weighing less than 50 pounds were inoculated with 25 c.c. of this serum-spore mixture. All remained well, as shown in Table 7, although they received in the injection approximately four billion spores.

In order that the apparent conclusion might be substantiated by results in a larger number of animals, new mixtures of serum and spores were made in the proportions and manner previously described, and the experiment was repeated, using the same precautions which were taken in the previous experiments to insure and prove the toxin-producing ability and viability of the spores. The animals, both cholera immune and susceptible, shown in Table 8, gained weight during the entire test period and showed no undesirable effects following the injection of this spore-anti-hog-cholera-serum mixture, either when used alone or simultaneously with hog-cholera virus. Each 30 c.c. dose contained approximately five billion spores.

To determine whether or not *B. botulinus* and hog-cholera virus in symbiosis exert an action which differs from that obtained by a *B. botulinus*-hog-cholera-serum mixture as shown in Table 8, the following experiment was conducted: Spores were planted in commercial hog-cholera virus, following the technique previously described. This was injected simultaneously with anti-hog-cholera serum into both susceptible and cholera-immune swine. It will be observed in Table 9 that all animals inoculated with this material remained well.

The combined action of botulinus spores and hog-cholera virus on susceptible pigs unprotected by hog-cholera serum was next studied to determine whether such contamination altered the syndrome ordinarily observed in cholera. The time and manner in which these animals sickened differed in no respect from those of animals inoculated with virus known to be free from contamination.

The results recorded indicate that spores of *B. botulinus* in

TABLE 8.—EXPERIMENT TO DETERMINE THE ACTION OF *BACILLUS BOTULINUS* SPORES IN ANTI-HOG CHOLERA SERUM ON BOTH SUSCEPTIBLE AND IMMUNE SWINE.

Pig No.	Description	Material inoculated	Dosage	Results
2562	Cholera immune	Hog-cholera-serum-spore mixture	30 c.c. ¹	Remained healthy
2573	do.	do.	do.	do.
2768	do.	do.	do.	do.
3752	do.	do.	do.	do.
6545	do.	do.	do.	do.
6350	do.	do.	do.	do.
2576	do.	do.	do.	do.
3757	do.	do.	do.	do.
2612	do.	do.	do.	do.
3756	do.	do.	do.	do.
4066	do.	do.	do.	do.
3751	do.	do.	do.	do.
3779	Cholera suscep- tible	do.	do.	do.
3774	do.	do.	do.	do.
3777	do.	do.	do.	do.
3783	do.	do.	do.	do.
3781	do.	do.	do.	do.
3786	do.	do.	do.	do.
3788	do.	do.	do.	do.
3780	do.	do.	do.	do.
3770	do.	do.	do.	do.
3773	do.	do.	do.	do.
2769	Cholera immune	Hog-cholera-serum-spore mixture and hog-cholera virus.	do.	do.
3754	do.	do.	do.	do.
2188	do.	do.	do.	do.
2199	do.	do.	do.	do.
2774	do.	do.	do.	do.
4293	do.	do.	do.	do.
2770	do.	do.	do.	do.
3765	Cholera suscep- tible	do.	do.	do.
3768	do.	do.	do.	do.
3769	do.	do.	do.	do.
3784	do.	do.	do.	do.
3778	do.	do.	do.	do.
3782	do.	do.	do.	do.
3785	do.	do.	do.	do.

¹ Each cubic centimeter contained approximately 180 million spores.

phenolized anti-hog-cholera serum failed to produce a toxin and that swine inoculated with massive amounts of spores in anti-hog-cholera serum did not develop botulism. Orr (11) has shown that botulinus spores placed in unphenolized defibrinated guinea-pig blood develop a strong toxin within 30 hours. Since

TABLE 9.—RESULTS OF INOCULATION WITH HOG-CHOLERA-VIRUS-SPORE MIXTURE.

Pig No.	Description	Material inoculated	Results
3753	Cholera immune	Virus-spore mixture (2 c.c. ¹) and Hog-cholera serum (30 c.c.).	Remained healthy
7613	do.	do.	do.
4066	do.	do.	do.
2598	do.	do.	do.
2772	do.	do.	do.
2771	do.	do.	do.
3775	Cholera susceptible	do.	do.
3772	do.	do.	do.
3767	do.	do.	do.
3776	do.	do.	do.
3766	do.	do.	do.
3771	do.	do.	do.

¹ Each cubic centimeter contained approximately 180 million spores.

this differed from our results when using a phenolized blood serum medium, the following experiment was conducted: Fifteen-tenths of a cubic centimeter of toxin-free spore suspension was placed in 25 c.c. of unphenolized defibrinated hog blood and allowed to remain in contact for eleven days. Mice inoculated with 0.3 c.c. died in nine hours, whereas guinea-pigs receiving 0.5 c.c. died in twelve hours. It is interesting to note that the characteristic odor associated with *B. botulinus* was present in this unphenolized spore mixture, whereas it was never observed in the phenolized mixture.

Although this experiment has been conducted on a small scale, the results are in close accord with those obtained by Orr (11). The striking contrast in the results obtained with phenolized and unphenolized defibrinated blood suggests an inhibitory action upon the toxigenic activities of *B. botulinus* by the phenol in anti-hog-cholera serum and hog-cholera virus. These experiments with phenolized and unphenolized blood are being repeated on a larger scale.

SUMMARY

Examinations of 134 samples of anti-hog-cholera serum and hog-cholera virus described in this paper, supplementing 1,700 previously conducted, failed to reveal the presence of *Bacillus botulinus* or its toxin.

B. botulinus did not produce toxin in phenolized anti-hog-cholera serum.

B. botulinus in symbiosis with phenolized hog-cholera virus did not produce toxin.

A strong toxin was formed in unphenolized defibrinated hog blood which had been artificially inoculated with botulinus spores.

Healthy swine inoculated with anti-hog-cholera serum and hog-cholera virus artificially inoculated with toxin-free botulinus spores acted no differently from those which receive serum or virus free of *B. botulinus*.

Susceptible swine inoculated with hog-cholera virus and botulinus spores showed no difference in temperature, symptoms, postmortem lesions nor time of sickening from those regularly used in virus production.

In unphenolized hog blood in which *B. botulinus* is growing

the odor considered characteristic of *B. botulinus* was marked, whereas in phenolized anti-hog-cholera serum or virus no odor was observed.

REFERENCES TO LITERATURE

1. Jour. Amer. Vet. Med. Assoc., Oct., 1921, p. 76.
2. Amer. Jour. Pub. Health, April, 1921, p. 352.
3. Jour. Med. Research, vol. 42, No. 2, p. 129.
4. Jour. Infect. Diseases, Sept., 1921, p. 267.
5. Jour. Path. and Bact., Jan., 1916.
6. Jour. Amer. Med. Assoc., May 1, 1920, p. 1220.
7. Arch. Internat. Med., 1921, vol. 27, p. 265.
8. Jour. Amer. Med. Assoc., Jan. 11, 1919, p. 88.
9. Jour. Canadian Med. Assoc., 1918, p. 2.
10. Jour. Amer. Med. Assoc., Sept. 20, 1919, p. 907.
11. Jour. Infect. Diseases, Jan., 1922, p. 118.

DISAPPEARANCE OF MALARIA IN TEMPERATE CLIMATES

Malaria, formerly a disease common to the temperate as well as to warmer climates, has now become practically extinct in the temperate zone and is rapidly disappearing even in warmer regions. Dr. C. Joyeux,¹ professor of parasitology in the Paris Medical School, has recently commented on the disappearance of the disease from France. There is evidence to show that this disease was extremely prevalent in France in past centuries. Now Joyeux presents evidence that the anopheles still abound in many regions, although there has been little or no malaria for generations in these districts. He calls attention to the explanation for this paradoxical fact published simultaneously by Roubaud² in France and Wesenberg-Lund³ in Denmark. According to these observers the mosquitoes, which used to feed on human blood, still do so in tropical countries; but in temperate zones they are attracted to barns and stables where they can find moisture, warmth and protection from the winds, and where they can feed on horses and cattle. According to Roubaud, in the course of time the mosquitoes have apparently developed a zoophile strain, being more attracted to cattle than to human blood. This has contributed to the elimination of malaria in the colder countries.—*Journal of the American Medical Association* (Nov. 12, 1921, vol. 77, p. 1578).

¹ Joyeux, C. Presse Méd., vol. 29, p. 1392 (Sept. 24, 1921).

² Roubaud, E. Ann. Inst. Pasteur, April, 1920.

³ Wesenberg-Lund. Mém. Acad. Roy. Sci., vol. 7, p. 8 (1920-21).

CLARIFICATION OF HOG-CHOLERA DEFIBRINATED-BLOOD ANTITOXIN

By R. R. HENLEY

*Biochemic Division, Bureau of Animal Industry, United States
Department of Agriculture*

THE METHOD of preparing clear and sterile anti-hog-cholera serum described by Dorset and Henley (1) in 1916, and now in general use in the industry, is applicable only to fresh and non-phenolized defibrinated or citrated blood. For various reasons it may be desirable to clarify, concentrate, or, at times, sterilize old phenolized defibrinated-blood antitoxin. In the past this has been done either by a modification of the Banzhaf-Gibson (2) process or by the heat-salt process (3) developed in these laboratories. As those processes are expensive and are difficult and tedious of operation, efforts have been made to develop a process that will serve to clarify, concentrate and sterilize old defibrinated-blood antitoxin as simply and easily as the bean-salt (1) process accomplishes those ends in the case of fresh defibrinated or citrated blood.

In fresh defibrinated-blood antitoxin the cells, which are known to be inert, are intact, and on this account the entire cells, both the stroma and contents, consisting for the most part of hemoglobin, can be separated easily from the serum by the bean-salt process. In old defibrinated-blood antitoxin a very different condition exists, because of the fact that the greater part, if not all, of the cells have been broken down or hemolyzed and the liberated hemoglobin has passed into solution in the serum. Bean extract will agglutinate and thus facilitate the removal of the disrupted stroma, but it has no effect whatever upon the dissolved hemoglobin, and so is of no avail in aiding its removal.

It was believed that a selective precipitant for hemoglobin could be found, and a search for such a reagent was instituted. In this search the action of a great variety of materials was studied, and simultaneously a search of the literature was conducted. A statement by Mann (4) that chloroform would precipitate hemoglobin attracted attention and promised fulfillment of the quest. While the first attempts to precipitate hemoglobin

with chloroform were disappointing, in that only small amounts of hemoglobin were precipitated, it was soon found that this precipitation was complete (1) if the blood contained at least 0.5 per cent of phenol, (2) if the temperature of the blood did not exceed 40° F. when the chloroform was added, and (3) if the mixture of blood and chloroform was thoroughly shaken. When the factors influencing the action of chloroform on hemoglobin were understood the following process to separate clarified serum from old blood was devised.

PROCESS FOR THE REMOVAL OF STROMA AND HEMOGLOBIN FROM OLD DEFIBRINATED-BLOOD ANTITOXIN

Step 1. Addition of Precipitants

A. Addition of bean extract to remove cells and stromata—To 500 c.c. of phenolized (0.5 per cent phenol) old defibrinated-blood antitoxin in a balloon flask, previously chilled to 40° F. or lower, 10 to 15 c.c. of bean extract (5) is added and the contents of the flask are agitated by hand.

B. Addition of chloroform.—Immediately following *A*, 50 c.c. of chloroform is added to each 500 c.c. of blood and the contents of the flask are agitated by hand.

C. Addition of salt.—This procedure should be used only when the serum is to be separated from the clot by *filtration* as described later. Promptly following the completion of *B*, add 5 grams of sodium chloride and transfer the flask and its contents immediately to a shaking machine.

Step 2. Shaking

Unless shaking promptly follows the addition of chloroform a clot will form at the bottom of the flask; therefore the transfer of the flask and its contents to the shaking machine should follow immediately the completion of Step 1. It is essential that the mixture of the blood and chloroform be agitated thoroughly in order to secure the maximum precipitating effect. For shaking, a power-driven Camp shaking machine is used, but other shaking machines will doubtless answer the purpose. The mixture is shaken for 10 minutes, following which the blood will be found to be in a semisolid clot from which a clear, light-red serum will exude on standing.

Step 3. Separation of Serum

The serum may be separated from the clot by centrifugalization, or by filtration.

(1) Centrifugalization.—Either the continuous or bucket type centrifuge may be employed. As the blood after shaking is

usually clotted into a semisolid mass, it is necessary, in order to remove it from the container, to break the clot. This may be accomplished easily if the clot is allowed to stand until the serum exudes and then is slightly shaken by hand until it is reduced to the desired fluidity. With this precaution the serum may be easily separated from the clot by either type machine. It may be mentioned, however, that it will be advisable to use a continuous type machine only when it is of sufficient capacity to care for a considerable quantity of precipitate. Separation with the bucket type machine is accomplished in the same manner as in the separation of serum from cells of fresh defibrinated or citrated blood by the bean-salt process.

(2) *Filtration*.—The separation of the serum from the clotted hemoglobin may also be accomplished by filtration through paper. For filtering the serum from the clotted hemoglobin a filter tray¹ instead of the usual funnel has been employed advantageously. The clotted blood is filtered in lots of 1,000 c.c. each, as the filtrate from this amount of blood has been found to pass through one tray in 8 to 12 hours, giving a transparent, light-red serum. A yield of at least 500 c.c. of clear serum should be obtained from each 1,000 c.c. of blood at this stage, but this does not represent all of the serum present, as, because of the bulkiness of the hemoglobin precipitate, a considerable portion of the serum remains mechanically held in the precipitate. In order to recover this it is necessary to press it out of the precipitate, for which purpose the precipitate and the paper are transferred to a muslin cloth, which, after being folded into a bag-like shape, is placed in a fruit press and the mechanically retained serum pressed out. The volume of the pressings should not be less than 150 c.c. from the clot representing each 1,000 c.c. of blood. The expressed serum is combined with the clear serum obtained by direct filtration, as above described. In case the pressings are not entirely clear, they are clarified, previous to combination with the clear filtrate, by thoroughly incorporating in the pressings $\frac{1}{2}$ to 2 per cent of powdered infusorial earth and filtering the mixture through paper. This will remove effectually any trace of cloudiness from the pressings.

Step 4. Heating and Phenolization

The serum obtained as above described may be heated to 58° C. for one-half hour in the same manner and with the same results that attend the heating of clear serum obtained from fresh defibrinated blood.

Although a defibrinated blood may contain 0.5 per cent phenol, the amount usually added to insure keeping, it has been found that clarified serums obtained as a product of this process contain

¹ Ka. Ki filter tray.

on an average only about 0.2 per cent phenol, an amount insufficient to prevent spoilage; so it is necessary to add sufficient additional phenol to bring the phenol content to 0.5 per cent. Assuming the presence of 0.2 per cent phenol, it is then necessary to add of 5 per cent phenol one-fifteenth of the volume of the serum to be treated. Thus, if one has 950 c.c., add $1/15 \times 950$, or 63 c.c. of 5 per cent phenol.

PRECAUTIONS TO BE OBSERVED

The following precautions should be observed:

1. The blood should always be chilled to 40° F. or lower before adding the precipitants required in Step 1.

2. The blood should be transferred to the shaker and shaken immediately following the addition of the precipitants.

3. Shaking should be only sufficient to form a clot. Prolonged shaking will break the clot and render separation more difficult. Experience will soon teach the proper time to discontinue shaking.

4. After the clot has formed and the flask has been removed from the shaker, the flask may be allowed to stand until the clot contracts and serum exudes.

5. Phenol should be present in the defibrinated-blood antitoxin to the amount of at least 0.5 per cent. The addition of 40 c.c. of 5 per cent phenol to each 1,000 c.c. of phenolized defibrinated blood yields a product of slightly less color than if it is not employed, but products obtained in this manner have not been tested for potency, and the use of this additional phenol is not recommended at this time.

6. Because of the variation in amount of hemoglobin present in old blood, the amount of chloroform to be used can not be definitely stated. Fifty c.c. of chloroform to 1,000 c.c. of blood has been found to be ample in all cases. The minimum amount necessary to give complete precipitation should be used.

7. The clot after separation of the serum should be sufficiently dry to crumble when handled.

RESULTS OBTAINED BY THE APPLICATION OF THE PROCESS TO OLD DEFIBRINATED-BLOOD ANTITOXINS

The process has been applied to a large number of old defibrinated-blood antitoxins, as a result of which considerable data have been accumulated. In order to avoid the presentation of this rather large mass of detail, the results are merely summarized as follows:

1. *Yields.*—The yields of clarified serum by this process vary rather widely, due, in great part at least, to the wide variation in the amounts of hemoglobin that may be present. Of seventeen

old defibrinated bloods treated by the process, using centrifugalization in some cases to separate the serum, and filtration in other cases, the yields of clarified serum obtained, before final phenolization, varied from 56 to 75 per cent of the original volumes subjected to treatment, and gave an average yield, before final phenolization, of approximately 65 per cent. On the addition of the required amount of 5 per cent phenol solution necessary to insure a phenol content of 0.5 per cent in the finished product, the average final yield was approximately 69 per cent of the original volume treated. Blood to which salt was added gave as a rule slightly increased yields over corresponding blood to which no salt had been added.

A fresh defibrinated blood gave a yield of clear serum by the regular bean-salt method of 72.5 per cent, and the same blood after phenolization gave a yield of 67.2 per cent of clarified serum when treated by the bean-salt-chloroform process.

2. *Indicated losses.*—A chemical analysis of bloods before and after treatment by the process indicated that about 10 per cent of the globulins, which carry the antitoxin, may have been lost. However, in the method of analysis some stromata may have been determined as "globulins lost," and the figure 10 per cent may be too high. Some loss due to retention of the serum by the clot must occur. This loss may be minimized by insuring thorough separation of serum and clot.

3. *Effect of the process on bacterial count.*¹—Two old defibrinated-blood antitoxins which contained an average of 15,000 organisms per cubic centimeter, as determined by counts made on agar plates, were subjected to treatment by the process, and the final product, on plating, was found to be sterile.

4. *Effect on phenol content.*²—Clarified serums obtained as products of this process contained, on an average, only 0.2 per cent of phenol, although defibrinated blood from which they were prepared contained 0.5 per cent phenol.

5. *Results of tests on hogs.*—As it is recognized that the bean-salt process is an effective process for the separation of a clear, potent serum from defibrinated or citrated hyperimmune blood, and as the process described herein differs from that process only in that chloroform is used, it was not considered necessary to

¹ Test conducted by Dr. F. W. Tilley, Biochemic Division.

² Mr. R. M. Chapin, of the Biochemic Division, kindly made these determinations.

carry on any extended investigation as to the effect of the process on the potency of the serum. However, in order to determine if the addition of chloroform was in any way injurious, Serum 262, a defibrinated-blood antitoxin prepared in the Bureau of Animal Industry's laboratories, was treated by the process and the products were tested for potency.¹ Two products were obtained: (1) A clear, *unheated*, phenolized serum, and (2) a clear, *heated* serum. The total yield of clarified serum, after final phenolization, was 80 per cent of the original volume of blood treated. On this account the clarified serum was tested in doses of 80 per cent of those of the original defibrinated blood; that is, 10 and 15 c.c. doses of the original untreated blood were given to pigs that also received 2 c.c. virus each, and 8 and 12 c.c. doses of the clarified serums were given to pigs which also received 2 c.c. of virus each. All pigs remained normal throughout the test except one pig that received 12 c.c. of clarified heated serum and one pig that received 8 c.c. of clarified unheated serum. Each of these pigs exhibited slight diarrhea on the second day of the test, but showed no other reaction.

CONCLUSIONS

Of the various processes for the refinement and sterilization of old hog-cholera defibrinated-blood antitoxin which this laboratory has tried out, some on a large commercial scale, the process described herein appears to be by far the simplest and most practical. This process has never been applied on a commercial scale, therefore anyone contemplating its employment is cautioned to familiarize himself with the various steps of the process by first applying it to small quantities of blood. Furthermore, products obtained from such small quantities should be subjected to rigid potency tests in order to check up any losses in potency that may occur.

SUMMARY

The factors governing the reaction between chloroform and hemoglobin by which the hemoglobin of the blood may be precipitated were studied, and a process, based upon this reaction, for the separation of a clear, sterile serum from old defibrinated-blood antitoxin was devised.

¹ Dr. W. B. Niles conducted the potency tests.

It is shown that the yield of clarified serum separated by this process from old defibrinated-blood antitoxin approximates 70 per cent of the original volume, and that the product of the process is free from bacterial contamination. While analysis indicates that the globulin content of the serum suffers a slight loss, potency tests indicate that the loss of antibodies during clarification is very slight.

REFERENCES TO LITERATURE.

1. DORSET, M., and HENLEY, R. R. Jour. Agr. Research, vol. 6, No. 9, pp. 333-338.
2. BANZHAF, F., and GIBSON, R. Jour. Biol. Chem., vol 3, No. 4, pp. 253-263.
3. U. S. Dept. of Agriculture, Rept. of the Chief of the Bureau of Animal Industry. 1918-1919, p. 53.
4. MANN, GUSTAV. Chemistry of the Proteids, p. 472. London, 1906.
5. DORSET, M., and HENLEY, R. R. Jour. Amer. Vet. Med. Assoc., vol. 50 (n. s., vol. 3), No. 6, pp. 699-702.

A DOUBTFUL HONOR

An honorary medical degree has been conferred on former Field Marshal Ludendorff of the German Army by the medical faculty of the University of Königsberg in East Prussia. This news is chronicled in the *Munchener Medizinische Wochenschrift* under the significant heading "Let Us Hang Our Heads." In the diploma it is stated that the honorary title is given to "the hero who with the sharp blows of his unconquered sword protected the German people from the crowd of booty-hungry enemies." The *Darmstadter Zeitung*, official organ of the government of Hesse, remarks sarcastically: "Murder of the masses and doctor of medicine—they go well together." The attitude of evident disapproval on the part of these two influential journals goes far toward offsetting the action of the University and shows that German sentiment is not all in favor of honoring the late military "heroes."

Belgium has a state school of practical horseshoeing. Diplomas were granted to seventeen pupils who passed the 1921 examinations.

Investigation by the American Horse Association results in the statement that a better grade of horses appears on the streets of Boston than on those of any other city in the Union.

EFFECTS FOLLOWING IMPROPER METHODS OF EXTRACTING HYPODERMA LARVÆ FROM THE BACKS OF CATTLE

By S. HADWEN

*Chief Veterinarian, Reindeer Investigations in Alaska, Bureau
of Biological Survey, United States Department of Agriculture*

IT HAS GENERALLY been conceded by veterinarians, entomologists and others that the extraction of warble larvæ from the backs of cattle should be recommended to farmers. The benefits from the point of view of lessening the numbers of the parasites are obvious and can not be denied. As each warble fly may deposit several hundred eggs, every larva destroyed means much toward lessening the evil.

In 1916 the writer (1) called attention to the fact that the proteins contained within *Hypoderma* larvæ had toxic properties when injected into susceptible animals; that they produced marked symptoms and in some cases fatal results. In 1917 Hadwen and Bruce (2) published a full description of the experiments. The cooperative work accomplished in Denmark in the removal of *Hypoderma* larvæ has been referred to many times in the writings on warble flies, and it would seem opportune to review two of the latest papers on the subject. In a general way these papers show that the extraction of warble larvæ is not without its attendant dangers. To the writer it seems clear that Danish veterinarians have only just lately recognized the fact that a disease they designate as rosenfeber may follow the extraction of the larvæ.

Laust Brodersen (3), 1919, writes a very clear and concise paper on his observations made in a farming community in Norre Nebel, Denmark. He describes a disease in cattle which has some similarity to urticaria and which he calls rosenfeber. The affection is found during the spring and summer, and the cases are reported as occurring during the daytime or evening. Briefly the symptoms noted are as follows:

Fever is present, the pulse is full, the jugulars are distended. Tremors are noticed, especially of the lips, and the animals are restless and unruly. Edemas are the rule; the eyelids, muzzle,

submandibular region, occasionally the udder, the anus, and vulva are affected. Tears drop from the eyes, mucus from the nose, and there is frothing at the mouth. Breathing is labored and accompanied by a hissing sound. There is slight tympanitis, and rumination is irregular. The feces are thin and are discharged frequently. The treatment consists of bleeding, cold applications and febrifuges. The disease is acute, usually running a benign course.

In 1914-15 Brodersen saw many cases of rosenfeber in cattle following the extraction of the larvæ. He gives notes on seven cases which he treated. They occurred from April 20 to May 31. He also treated three cases in May, June and July where no larvæ had been extracted. In these latter cases he wonders if the larvæ had not been accidentally injured, and says that if this is the case, rosenfeber is a sickness caused by the absorption of poisonous material from the larvæ, or, more likely still, to the foreign albuminous material in the larvæ, and that if this theory is correct "the disease must be related to the so-called serum sickness." Brodersen does not mention any fatal cases.

In my preliminary note and in the subsequent paper with Bruce, fatal cases were described following the injection of warble juices. Several additional symptoms and lesions were described, such as coughing, bleeding at the mouth and anus, irritation of the skin, and a cyanosed appearance of the body. After the death of the animals, which was due to asphyxia, the blood remained incoagulable. These fatal cases may occur naturally, and if so, it is unlikely that veterinarians would have seen them, as death occurred in a few minutes.

As soon as the findings recorded by Brodersen were understood by most of the farmers, he states that they became frightened and completely stopped the practice of extracting the larvæ. He believes that the people who were paid to perform this work could not do so without damaging some of the larvæ, as they made only three visits to each herd during the season. The farmers were advised to undertake the work themselves.

Professor C. O. Jensen, 1919, reviews Brodersen's paper and recalls an experiment which he made on a calf sixteen years previously. This animal was injected with the juice derived from two small *Hypoderma* larvæ. In from one-half to two hours it developed symptoms suggestive of rosenfeber. An immense

edema of the eyelids and the anus occurred, also of the connective tissues elsewhere. Professor Jensen suspected rosenfeber, but did not like to call it so on account of its occurrence at the wrong time of year. Now that Brodersen has published his observations, Jensen says that it is very probable that all cases of rosenfeber are in some way or other connected with *Hypoderma* larvæ. Jensen argues that the toxic material acts like a lymphagogue of a transient nature. He writes at some length on the edemas found surrounding the larvæ in the gullet, and believes that they are not inflammatory, though Koek and De Vries consider that they are so. If the edemas are permanent they should produce clinical manifestations of their presence.

Jensen further states that during the past years no clinical observations have been brought out which would argue against the transient nature of the disease, with the exception of a single case of tympany. In this connection he mentions an interesting report by De Vries. A young animal, after feeding, suddenly became unable to swallow and was vomiting. A sound was introduced into the esophagus and difficulty was experienced in forcing it through the posterior end. A diagnosis of stenosis was made, probably due to a foreign body. The animal was slaughtered and in the posterior part of the esophagus a number of *Hypoderma* larvæ were encountered together with edemas of the submucosa. No foreign body was found and no injury to the esophagus. Prof. Jensen concludes that it is likely that a number of such cases have been misinterpreted in practice.

Jensen (4) says also: "The extraction of *Hypoderma* larvæ has been considered rather safe hitherto. In circulars issued by the German Imperial Health Department it is stated that there is no need to be afraid of injurious effects following the extraction of the larvæ. From different sources, however, it had been learned that urticaria might occur. Schöttler saw urticaria following in cases where the larvæ had been punctured and then squeezed out. He also said that by this method of treatment serious suppuration may follow. But as far as I know, no one has previously observed that the extraction may be followed by rosenfeber or similar disease."

The symptoms connected with Jensen's experiment which he saw after the injection he considers came on too rapidly for the albumen to be the toxic element responsible for them. In this

latter statement no doubt Jensen is wrong. The time he gives of one-half to two hours for the symptoms to develop is very much longer than necessary in most cases, when injections are made. In the 1916 experiments we found that in the fatal cases the results were immediate, and in the non-fatal they generally came on in a shorter period than half an hour. In some more recent experiments conducted on 10 calves, the three animals which gave marked reactions showed symptoms in fifteen to twenty minutes.

Jensen's idea that the swellings in the esophagus are transient is correct in a sense, and Hadwen and Bruce have shown that the larvæ move away when surrounded by edema. But they still remain in the esophagus, consequently the reaction against them still goes on, though the situations of the swellings may change. The question resolves itself largely on the degree of resistance on the part of the animal, as to whether the swellings are large or small (5).

CONCLUSIONS

The disease called "rosenfeber" in Denmark appears to be identical with hypodermal anaphylaxis. The reader is referred to articles which have appeared in this journal on this subject.

Squeezing out *Hypoderma* larvæ from the backs of cattle is a good method for lessening the numbers of warble flies and has been attended with considerable success in Denmark. However, to avoid unfavorable after-effects in the animals, the extraction of the larvæ must not be undertaken hastily nor must rough methods be used. Above all the larvæ must not be injured in the process.

The walls of the sac in which the larva lies are in the nature of a defensive barrier. This sac, in addition to holding the larva, contains pus cells and bacteria in many cases. It may also hold toxic material excreted by the larva. Therefore if the walls are lacerated a variety of reactions may take place. Softening the skin first with water and then squeezing the warble sacs should remove most of the larvæ. In cases where a larva can not be extracted by this method a round-ended pair of forceps might be used to stretch the opening and to assist in drawing it out. After the larva has been removed the cavity should be flushed out with clean water. In the cases where a larva has been rup-

tured accidentally the parts must be washed quickly to dilute and remove the toxic material.

The cooperative work in connection with the extraction of warble larvæ in Denmark had in 1919 been going on for some years, apparently without any drawbacks. At this late date, however, the Danish veterinarians and subsequently the farmers have discovered that troubles may follow what they thought was a perfectly safe practice. It would seem evident that the work was undertaken without a sufficient number of properly controlled preliminary tests.

It must not be thought, however, that the Danish veterinarians are to blame for not having foreseen or recognized the danger in removing the larvæ. The profession generally considered that the extraction of the grubs was simply a mechanical piece of work and was quite without danger to the host. When the cooperative work began in Denmark the dangers from *Hypoderma* were unknown.

The point the writer wishes to establish is that other countries should profit by the Danish experience. He still favors the extraction of the larvæ (and has so stated elsewhere), but he believes that before laymen are advised to undertake it in a wholesale manner further tests must be made.

The symptoms of anaphylaxis are so striking, though the disease is as a rule without danger of fatal results, that to a farmer it appears to be a serious matter. The cases which have been reported so far are few in number, but now that attention has been called to them, they may be found to be more common than was supposed. It is for this reason that careful tests should be made to settle this point.

1. HADWEN, S. 1916. Hypodermal anaphylaxis. Jour. Amer. Vet. Med. Assoc., vol. 2, No. 3, pp. 72-74, Figs. 1-2.
2. HADWEN, S., and BRUCE, E. A. 1917. Anaphylaxis in cattle and sheep, produced by the larvæ of *Hypoderma bovis*, *H. lineatum*, and *Oestrus ovis*. Jour. Amer. Vet. Med. Assoc., vol. 4, No. 1, pp. 15-41, Figs. 1-15.
3. BRODERSEN, LAUST. 1919. Om Rosenfeber hos Kvaeg. Maanedsskrift for Dyrlaeger, vol. 31, pp. 321-323.
4. JENSEN, C. O. 1919. Bemaerkninger on Hypodermalarvernes Forhold til Rosenfeber. Maanedsskrift for Dyrlaeger, vol. 31, pp. 324, 326.
5. HADWEN, S. 1918. Natural occurrence of eosinophilias. Jour. Parasitology, vol. 4, pp. 135-137.

LABORATORY DIAGNOSIS OF POULTRY DISEASES¹

By L. D. BUSHNELL and F. R. BEAUDETTE

Bacteriological Laboratories, Kansas Agricultural Experiment Station, Manhattan, Kansas

DURING the past few years the Department of Bacteriology has carried on investigational work in poultry diseases, and from the experience thus obtained we have been able to systematize the work considerably. While we have devised no new methods, we feel that the information obtained and the laboratory methods used may be of value to others. The aim in this work has been to make a rapid and accurate diagnosis of diseased conditions. That an accurate diagnosis is necessary goes without question, and from our own experience we have found that such a diagnosis based upon clinical and external symptoms alone is very often impossible.

As the poultry industry is one of the most important branches of agriculture, and as the people are gradually learning the value of poultry on the farm, the veterinarian should interest himself to a greater extent in poultry diseases and their correct diagnosis and control. We believe that the proper use of a bacteriological laboratory as an aid to the diagnosis of poultry diseases will greatly aid the busy practitioner and improve methods for the control and eradication of poultry diseases.

Since the beginning of the investigational work in this laboratory we have found some diseases quite prevalent in this State that were not known to occur here. Fowl typhoid may be given as an illustration. The diseased specimens were sent to the laboratory from various parts of the State, as well as including the vicinity of the Station.

A great many letters of inquiry have been received regarding poultry diseases. In some instances the description given was so characteristic that there was no doubt of the diagnosis. In other cases the description was incomplete or misleading. In replying to such letters we have suggested measures to be executed until a correct diagnosis could be made. In the meantime, the owner was instructed to send to the laboratory two or three

¹Contribution No. 42 from the Bacteriological Laboratories of the Kansas Agricultural Experiment Station.

of the affected birds for examination. These are sent by express in wooden crates, but chicks come admirably by parcel post in perforated pasteboard boxes.

CLINICAL FINDINGS

As soon as the live birds reach the laboratory a careful examination is made, which often permits an immediate diagnosis. Such is the case with those local conditions termed roup, bumblefoot, etc. Here the caseated mass found beneath the eyelids, the diphtheritic patches in the mouth and throat, or the wart-like growths on the unfeathered portions of the head lead to the diagnosis of roup, and the swollen foot to a diagnosis of bumblefoot. In other cases the symptoms are less suggestive and the birds must be kept until more specific symptoms develop or until death permits a postmortem and bacteriological examination. The nature of the droppings is noted, and if diarrhea occurs such diseases as cholera, fowl typhoid, botulism, and, in the case of chicks, white diarrhea, or in turkeys, blackhead, are indicated. The color of the droppings is also of value in that in certain affections there is a more or less characteristic color. Much whitish material and mucus in the feces is an indication of cholera, or white diarrhea in the case of baby chicks. A greenish tinge is indicative of fowl typhoid, though not of impossible occurrence in cholera. In doubtful cases the age of the bird might aid in the diagnosis, as fowl typhoid more often occurs in adult birds, while cholera affects birds of all ages. The whitish droppings of a bird suffering from botulism resemble those of a cholera fowl, but in this disease the other symptoms are so characteristic that we need not depend upon this feature. The yellowish droppings of the consistency of thick paint are seen only in cases of blackhead. These are often designated as "sulphur" droppings.

The color of the comb may be used as a guide in making a diagnosis, since this symptom is very reliable in cases of botulism, where a persistent bright red color is always seen. In cholera there is a marked tendency toward cyanosis, while an anemic comb is suggestive of fowl typhoid. The comb of an individual suffering from blackhead resembles that of one affected with cholera. A high temperature is not as diagnostic as

a subnormal one. The former may indicate any of the septicemias, while the latter is highly indicative of botulism.

BLOOD CULTURES

If the septicemias are suspected an attempt is made to culture the organism from the heart's blood while the bird is still living. The individual is placed in lateral recumbency with the left side up. After washing thoroughly the area over the heart with a 5 per cent solution of phenol, a point on an imaginary line drawn from the tip of the sternum to the back is located where maximum pulsation can be felt. About $1\frac{1}{2}$ to 2 inches from the point of the sternum a 2-inch sterile needle of 22 gauge, attached to a sterile Luer syringe, is inserted into the heart and a small amount of blood withdrawn. A portion of this is put in broth containing 1 per cent citrate to prevent clotting, and another portion is streaked on an agar plate. The use of the citrated broth is of value chiefly for the isolation of *Bacillus avisepticus* and *B. sanguinarium*. From the agar plate either may be obtained. A combination is an advantage. By such a procedure the organism can in many cases be cultured and identified before the death of the bird. In case no culture is obtained the bird is still available for further study.

The following record sheet is filled in for each case and a careful record kept of each bird:

RECORD SHEET

Case No. Date Cage No.
 Owner
 Address
 Breed Age
 Sex Leg band No.
 History
 Temperature
 Pulse
 Respiration
 External symptoms
 Diagnosis
 Treatment
 Prognosis
 Disposal

Laboratory Diagnosis and Postmortem Findings

Blood stain
 Agglutination (*B. pullorum*)
 Other tests
 Digestive tract
 Respiratory
 Urino-genital
 Parasites
 Miscellaneous

POSTMORTEM TECHNIC

As soon as an individual dies a careful postmortem examination is made. The feathers are thoroughly soaked to prevent dust. The bird is laid on its back and a linear incision is made through the skin from the vent forward, over the crop along the mid-ventral line. The skin is then removed from the sides and the exposed surface flamed. By means of a flamed knife, forceps and scissors an incision is made across the abdomen just behind the sternum. This is carried forward on both sides through the ribs to the anterior part of the sternum, where bone forceps are used to disarticulate the attachments. Such a flap laid forward exposes the abdomen and thorax. A red-hot spatula is used to sear the surface of the heart and liver. A Pasteur pipette is then used to aspirate material from these organs for cultures. In making the Pasteur pipettes a 6-mm. glass tube having thin walls is cut in 10-cm. lengths. These are plugged with cotton at each end and autoclaved in packages containing three or four. These may then be stored in the laboratory for future use. When desired for use a tube is withdrawn from the package, heated in the middle in a Bunsen flame, and drawn out into a capillary tube. By breaking such a tube two pipettes are made. It has been found that by using the Pasteur pipette a maximum number of pure cultures can be obtained. Such a pipette is much more effective than a wire loop, since larger amounts of material can be transferred. In taking material from the liver of birds dead for some time, the specimen should be taken in an area some distance from the surface of the intestine.

The agar plates used for streaking are made from meat infusion with a reaction of about pH 8.0. The fluids from the tissues should be well streaked over the surface of the agar with a sterile wire loop, otherwise growth may not occur. If growth occurs on the plates, fermentation tubes containing dextrose, lactose, maltose and saccharose broth, as well as tubes of nitrate broth, peptone solution and litmus milk, are inoculated. Bromthymol-blue is added to the fermentation tubes as an indicator. These tubes are incubated at 37°C. and observations are made daily. By means of the fermentation reactions the organism can usually be identified in 24 hours. The reduction of nitrates

is tested after Griess's method, and Ehrlich's aldehyde is used in testing for indol production. The culture should be allowed to incubate four days for the latter test.

The following protocol will illustrate the reactions of the more common organisms isolated:

Name	Dextrose		Lactose		Maltose		Saccharose		Nitrate Reduction	Indol Formation	Litmus Milk
	A	G	A	G	A	G	A	G			
<i>B. sanguinarum</i>	+	-	-	-	+	-	-	-	+	-	Acid, alkaline in about 14 days.
<i>B. avisepticum</i>	+	-	-	-	-	-	+	-	+	+	No change.
<i>B. pullorum</i>	+	+	-	-	?	?	-	-	+	-	Acid, then alkaline in 14 days.

Key to symbols: + = positive; - = negative; ? = variable reactions.

In cases of suspected tuberculosis an acid-fast stain of material from a lesion will suffice.

A careful search is always made for intestinal parasites and the air-sac mite.

Botulism has but recently received a proper amount of attention as a disease of poultry. The chief symptom is that of limberneck in fowls, and a laboratory method of diagnosis is quite essential. A rapid diagnosis is sometimes made as follows: Wash the contents of the gizzard into a flask of sterile salt solution and after shaking the suspension thoroughly allow to stand until the coarser particles have settled. A few cubic centimeters of this material is passed through a Berkefeld filter and 1 c.c. is inoculated into each of two guinea-pigs. Inoculate one of the pigs with 250 units of polyvalent botulinus antitoxin as a control for toxic conditions not due to *B. botulinus*. Symptoms of intoxication often develop in the animals within twenty-four hours after inoculation. The first sign is that of a slight paralysis of the legs and the inability to swallow. The symptoms become more and more pronounced until death ensues.

A new milk-producing champion for the territory east of the Rockies has been discovered in Kolrain Finnerne Bess, a Holstein cow owned by F. F. Field, Dutchland Holstein Farms, Brookton, Mass. Her record is 32,563 pounds of milk in one year.

PENNSYLVANIA INSTRUCTIONS FOR THE OPHTHALMIC TUBERCULIN TEST

By T. E. MUNCE

State Veterinarian, Harrisburg, Pennsylvania

THE Bureau of Animal Industry, Pennsylvania Department of Agriculture, issues the following instructions to Bureau agents and practicing veterinarians with regard to the ophthalmic tuberculin test:

Pennsylvania does not recognize the ophthalmic tuberculin test as an official test when used alone. It is a most valuable adjunct and can be used at any time, or in combination, without interfering with the efficiency of the other tuberculin tests or having its results modified by their influence.

TECHNIQUE

As in the other tuberculin tests, the identity of each animal should be established and recorded. Examine the eyes for any abnormal conditions. Do not apply the test to animals which show any local inflammation of the eye.

Ophthalmic tuberculin is prepared in both disc and liquid form. In applying the liquid, a curved glass dropper, with an outlet as small as possible, is preferable. The animal's head is held by an assistant in such a position that when the operator drops the liquid tuberculin into the eye it will be diffused over the entire surface. Close the eyelids with the hands for a few seconds, to prevent escape of the tuberculin.

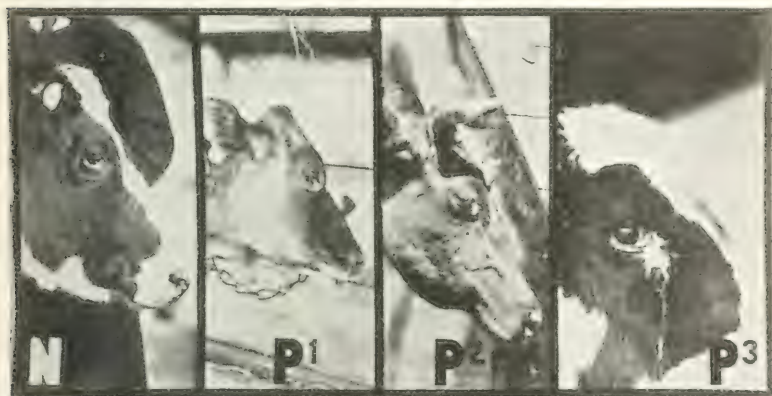
In instilling the disc, place the disc between the thumb and the first finger. Remember that clean hands with short, smooth finger nails are necessary. The animal's head must be held by an assistant in such a way that the operator can, with his thumb, place the disc well back on the eyeball, under the upper lid, and toward the outer canthus of the eye. The hand should then be placed over the eyelids for a few seconds, until the disc dissolves.

APPLICATION OF TEST AND HOURS OF OBSERVATIONS

In making an ophthalmic test the eye should be sensitized with two or three drops of a 4 per cent solution of tuberculin,

or one disc when these are to be used. No record of the results of this sensitization are usually made, although sometimes a reaction occurs.

Three or four days after the eye has been sensitized we apply two or three drops of 8 per cent solution of liquid tuberculin or two discs. Observations should be made at the third or fourth



Results of Ophthalmic Tuberculin Test

hour after the instillation of the tuberculin and continued every two hours until the twelfth or fourteenth hour. The other eye should be used as control.

INTERPRETATION OF TEST AND CODE FOR RECORDING RESULTS

The following code is used in recording the ophthalmic test:

1. Animals showing no reaction shall be recorded at each observation as N (negative).
2. Reaction shall be recorded as follows:

Small amount of pus.....	P 1
Much pus, or a distinct purulent discharge.....	P 2
Abundant pus, combined with hyperemia of the conjunctiva and swelling of the lids.....	P 3

The accompanying illustrations will serve as a guide in interpreting and recording results.

In observing the results of the test, do not be confused by a slight white mucous discharge that often occurs soon after the tuberculin has been instilled.

THE VISCERA OF THE COW ¹

By S. Sisson

*College of Veterinary Medicine, The Ohio State University,
Columbus, Ohio*

IT is hardly necessary for me to assure you that I have no intention of attempting to inflict upon you anything like a comprehensive account of the bovine viscera. Titles in programs must be short and therefore, as in the present case, usually include very much more than a speaker expects to deal with. The object of this paper is to present some data concerning these organs which, so far as the speaker is aware, have not been published, and some others which are not in agreement with current statements. A few physiological and clinical implications may be alluded to if time permits.

A little more than 20 years ago the speaker introduced into the study of the anatomy of the domestic animals the method of intravascular injection of formalin solution. It is a simple statement of fact to say that this procedure inaugurated a new era in veterinary anatomy, just as it had done in human anatomy a few years before. The most radical revision of our views has occurred with reference to the viscera, and it soon became evident that the description of these must be rewritten. Investigation and consequent modification of our ideas are, of course, continuing, as must be the case in any branch of science which does not propose to die of inanition. To some this statement will seem a mere platitude, since they know that anatomy is a very active and growing science. Unfortunately, however, many members of our profession who should know better seem to think that the anatomical field is largely exhausted, and are satisfied with the descriptions in the literature of a generation and more ago. Such an attitude might be viewed with complacency were it not for the fact that many of the results of recent investigations are of great practical importance, and that much of our clinical literature contains numerous anatomical errors and solecisms, which are very perplexing and misleading to the student and young practitioner. It is also evident that our

¹ Presented at the fifty-eighth annual meeting of the American Veterinary Medical Association, Denver, Colo., September 5-9, 1921.

physiological literature contains a good many statements which are obviously incorrect or are mere assumptions which have not even the merit of plausibility. The rather iconoclastic attitude which is connoted by the foregoing remarks is not assumed for the purpose of "making an impression," but simply to induce the open mind and the prompt rejection of errors which are prime factors in scientific progress.

The speaker then showed a series of about fifty lantern slides, made from photographs, taken by him, of dissections and frozen sections which had been embalmed by intravascular injection of 20 per cent formalin solution so as to fix the organs in their natural shape and position. The following are some of the more important features which were demonstrated:

The form of the lungs and the contour of the "superficial cardiac area" on both sides of the thorax; relationship of the thoracic organs to the ribs determined by the method of serial photographs and superposition of negatives; relation of these data to auscultation and percussion.

The form and position of the abdominal viscera, including the more common variations; topographic changes during pregnancy; correction of current erroneous views concerning the position and relations of the omasum and abomasum in particular; relationships of the reticulum, with clinical implications in regard to traumatic gastritis and related lesions; anatomical data with reference to the mechanism of deglutition and the movement of food in the stomach; clinical implications concerning digestive disturbances and methods of medication.

The arrangement of the uterus and ovaries, and changes of form and position in the pregnant animal; other variations; implications concerning exploration per rectum.

The French Société Centrale de Médecine Vétérinaire announces sixteen competitive prizes, ranging from 250 to 1,200 francs, and several medals, to be awarded during 1922 to veterinarians and veterinary students for excellence in various lines of education and research. The French Ministry of Agriculture granted to the society a subsidy of 1,000 francs for the year 1921. Such awards and recognition no doubt have an influence in encouraging veterinary progress.

Two French veterinarians have recently been honored by the French Academy of Sciences. Dr. Edouard Bourdelle, professor of anatomy at the Alfort school, has been awarded a prize of 2,500 francs for his work on "Regional Anatomy of Domestic Animals," and Dr. H. Velu, chief of the research laboratory of the livestock service of Morocco, has received a citation.

HERD EFFICIENCY FROM THE STANDPOINT OF THE VETERINARIAN ¹

By EARLE B. HOPPER
New York, N. Y.

WITHIN the last few years the interest shown in dairy husbandry in this State has greatly increased. Recently the breeders have more closely associated themselves with one another and the national organizations of each breed are doing much to aid the local organizations and breeders in this State.

A few weeks ago I read the following from the *Holstein-Friesian World*: "New Jersey has a well-organized Holstein association with active breeders in charge of its management and with a field secretary, J. W. Bartlett, who has an acquaintance throughout the State by reason of his former connection for several years with the experiment station as a dairy extension specialist. New Jersey has not been organized on a State-wide basis very long, but the fund available for this work amounts to over \$5,000 per year for three years and the State is adding to that fund right along."

The breeders of Guernseys, Ayrshires and Jerseys are also becoming better organized.

With this improved organization, proper advertising, State-wide publicity, etc., cattle owners within the State will come to realize the value of purebred livestock. There is an increasing number of men who realize that sections of New Jersey are ideal dairy localities. They also realize that this State is in a position to take advantage of the demands of the surrounding markets. The market for export will increase. The South is becoming more and more interested in improved livestock, and it is the belief of some breeders that the demand will be greater than the supply.

With these facts in mind, the breeders of this State have been encouraged to purchase the best animals obtainable. Due to stringent money conditions, I am sure it has been a sacrifice on the part of many; they realize, however, that when livestock of proper breeding is offered for sale that is the time to buy.

¹ Presented at the semi-annual meeting of the New Jersey State Veterinary Medical Society.

At two Holstein sales New Jersey breeders purchased 12 animals at an average of \$1,580, and from three Guernsey sales 15 animals at an average of \$1,888. The highest priced animal in these five sales which was purchased to come to New Jersey cost \$4,150. The general average for the five sales paid by New Jersey breeders was \$1,734; the average paid by the combined breeders of the other States was \$823. It is therefore apparent that New Jersey breeders are obtaining the best that is offered. At our last State sale in Trenton 69 animals were sold, 60 of which were repurchased by breeders in this State at an average of \$314. I have not had an opportunity to compute the results of other sales, but from observation I am sure that the same condition exists.

With this increased valuation within the State and with the increased interest of the breeders for better stock, it naturally follows that their investments in this type of animal must be protected by proper and efficient veterinary service. A few years ago the bovine in some localities represented such a small investment that it was a question whether it was advisable to pay a veterinarian half of her face value for treating her and then take the chance of losing her, or to use home remedies and simply replace her if death should follow. Today the purebred, because of special lines of breeding, oftentimes can not be replaced. It is therefore to the interest of the owner, as a protection to his investment, to procure the best veterinary service obtainable in his locality.

With an increased number of high-priced animals kept under more artificial conditions it naturally follows that the practitioner will receive more patronage from the breeders at a more remunerative fee. If the owner is not in constant association with the farm the herdsman as a rule does not care to take the responsibility of a valuable animal during any deviation from normal health, although to his mind the disorder may be of a trivial nature at the outset. Therefore we as practitioners will be called to treat the various ailments of these valuable bovines just the same as we have been called to treat valuable equines and canines.

There are many factors in the health of the bovine that have not been considered to any marked degree. Among these are feeds and feeding, breeds and breeding, diseases of the skin,

udder and feet, teat surgery, digestive disorders, dystokia, breeding diseases, and diseases and the rearing of calves.

The practitioner in order to gain the confidence of the breeders must have a working knowledge of the different types of breeds. Not long ago I was called in consultation by an owner, a new breeder, who had assembled eighteen purebred Guernsey females. The local practitioner met me at the station and on our way to the farm, after describing the case to me, told me that Mr. J. certainly had a nice little Jersey herd started. I did not wonder that the owner had but little confidence in this man, because if he made such a mistake to me very likely he had made the same mistake to him or the herdsman. If his local practitioner knew no more about cattle than that, then how could the owner entrust the entire care of this individual to him, taking a chance on losing his original investment of \$800 and the calf she was carrying? We should therefore know the breeds, especially those in our locality.

We very seldom step into a breeding establishment without someone telling us what this or that cow is milking or has milked. If it is the herdsman, he is proud of the performance because he figures that through his feeding and care the animal has been able to make this fine showing. If it is the owner, he is proud to say that he owns such an animal. We should know, then, if we are told her production and age, whether she is the individual and producer they think she is. A knowledge of the different classes according to ages and breeds will enable us to converse intelligently, which may, and probably will, lead to our advice in the owner's next purchase or in one of our other clients' purchases.

Added to a knowledge of the breeds we should be good judges of dairy type and conformation. When I was visiting a good herd some time ago, which was a biennial occurrence, the wife of the owner came in. After some conversation she stopped in front of the stall in which the best female in the herd is kept and said to me: "If you can't suggest a way whereby we can have more fat on that cow's back, we will have to get rid of her, as I can't stand to see such a thin-backed animal around." After a few minutes of explaining the proper dairy type and conformation, capacity for food and power for production, I stepped to the milk chart to prove my statement that she was

the best producer in the herd. She thanked me for my information and was very much pleased to be enlightened on these few fundamental dairy facts. I have since learned that her interest in the dairy department of the farm is now almost as great as in her gardens.

We should know feeds and some of the fundamentals of feeding. For instance, an animal should be fed 1 pound of a balanced grain ration to 3 or $3\frac{1}{2}$ pounds of milk up to 40 pounds. Above 40 pounds of milk she should receive 1 pound of grain to 4 or 5 pounds of milk, according to her ability to digest and assimilate. This depends largely upon the individual ability of the cow. A ration should consist of half bulky and half heavy feeds. There should not be over 40 per cent of cottonseed and oil meal (high protein feeds) in a ration. We should be familiar with a balanced ration for various types of cattle. For dairy cows: Bran 2 parts, cornmeal 1, ground oats 2, gluten 1, cottonseed 1 and oil meal 1. A good ration for calves consists of ground oats 3, hominy 3, bran 3, oil meal 1. This is also an ideal grain ration for dry stock before fitting. Service bulls receive a mixture of 1 part of bran, 2 ground oats, and 1 oil meal, quantity depending on condition of animal and number of services. Practical knowledge along these lines will enable the veterinarian to gain prestige with breeders. While visiting various localities in other States I have found that many practitioners are, to a certain extent, unfamiliar with some of the more common principles of feeding previously mentioned that are often encountered in dairy practice.

I do not feel qualified to discuss but few of these many phases of dairy practice that are presented with more and more importance as the value of our livestock increases. I have simply mentioned a few, and there are many more that should be considered, each by itself, and discussed by one who is thoroughly familiar with that phase of practice.

The few suggestions that I am going to present in handling bovine practice will be confined to breeding diseases, diseases of the newborn and the rearing of calves, as they apply to herd efficiency rather than to specific cases. The three essentials of all successful herds are a good yearly crop of calves (the ideal being one calf per cow each twelve months), a maximum milk production and maintenance of health. We can not fail in any

of the three and have efficiency. In the purebred herd calves may be the source of revenue, but we must have production for records to make the calves valuable. In the grade herd we must have production for revenue, but new milk cows are essential to keep up a maximum production. In these two extreme cases the income would be derived from the calves in the one and the milk in the other. But in either case *reproduction is the keynote*.

In order to produce a living healthy calf it is essential that the male and female elements be normal, having the power union, division and growth. Their respective points of origin and surroundings must be free from disease and harmonized by the proper secretions from both male and female at the time of copulation. The elements of reproduction, if fertilization does take place, are governed by the post function or internal secretions of the ovary and corpus luteum as well as the proper functioning of the other glands of internal secretion. There are often cases of nonfertility that may not be associated with infection; this phenomenon has already been proven in human medicine.

There are certain processes, the result of pathological and bacteriological changes in the genital tract, which greatly decrease the possibilities of fertilization. There are varying degrees of these changes and infections in both males and females, and we find these conditions in different stages of development. Fertilization between the same two animals taken as a standard may not take place. This may be due to the male, who may be totally sterile or his potency may vary from any degree of disease to normal. The female as well as the male may be diseased in any portion of her tract so that death of the sperm cell may result. Obstruction of any part of the female genital tract may prohibit the passage of the sperm cell to the ova. A change in the character of the secretions of any part of the genital tract may render the ova or sperm cells impotent. The ova may not be properly formed or eliminated from the ovisac.

If fertilization does occur, death of the resulting union may come at any time. First, because conditions may be such, due to a certain degree of infection or change, that fertilization takes place but the embryo perishes at an early date while still microscopic in size. Second, fertilization takes place, followed

by death of the fetus at any time, without immediate expulsion, resulting in decomposition, maceration, excessive formation of pus or mummification. Third, fertilization followed by expulsion of the embryo or fetus at any time prior to the normal termination of pregnancy. Fourth, fertilization followed by a living but weak calf. Fifth, fertilization, a living calf, normal parturition, followed by death of the calf in from 12 to 24 hours from septicemia. Sequelæ—retained placenta, acute metritis, chronic pyometra, salpingitis, abscess formation, adhesions and sterility.

Clinically, then, we have all stages of non-production. I do not see how we can draw any conclusion as to where premature birth or death of the fetus begins or where it ends. The calves that are born, apparently at full time, in herds where the ravages of disease are high have considerable trouble as a rule in their early lives, and when they reach maturity infection makes itself manifest by shy breeding and the necessity of repeated services before conception. It seems, to the best of our present-day knowledge, that unless we breed healthy males to healthy females our troubles may be endless. If we are to control breeding diseases and aid in the reproduction of healthy cattle we must take into consideration all factors which may cause nonconception, and not only those which might cause the recognized expulsion of the fetus.

The genital system of the female is composed of ovaries, oviducts, uterus, cervix and vagina (together with the mammary gland). Any deviation from normal in any one of these closely associated parts may in itself be responsible for non-fertility. We believe that with proper treatment we can alleviate disease to a marked degree from all of these parts except the oviduct. Experimental work has been done in recognizable salpingitis to remove entirely the oviduct and have the ovary function directly into the uterus. The results of this work to date have not been satisfactory. The extent of disease in the herd, character and nature of past treatment, degree of virulence of the infection, sanitation measures and potency of the males are important factors that determine the degree of success that may be attained.

The majority of the more persistent cases of nonbreeders are suffering from either cervicitis or salpingitis. Numerous cases

of cervicitis have responded more readily to treatment by using a 1 to 2 per cent solution of hot chlorazene to dissolve the mucus throughout the cervix, followed by dressing with various iodine preparations, Lugol's, iodex, etc. Amputation of the cervix affords quick and prompt relief in many chronic cases, and oftentimes amputation of the rear or first fold brings relief.

The genital system of the male is composed of the testes, epididymes, vas deferens, seminal vesicles, the prostate, Cowper's glands and the penis. Inflammation of the testes and epididymes is not uncommon. Many times an inflammation of the seminal vesicles is recognizable. Slight abnormalities of these portions of the tract may produce any degree of lessened potency. Bulls so diseased have proven very disastrous in some herds. After the removal of diseased bulls and the treatment of females which they have apparently infected a new and normal herd sire will greatly reduce the number of services per conception and the recognized abortion rate.

In beginning our work in the control of breeding diseases it is essential that we obtain considerable history of the breeding operations at the farm. As a rule, especially at well-organized farms, we can learn the number of calves, the number of recognized abortions, the number of retained placentas and the number of deaths in calves apparently normal at birth. This will give us a knowledge of the general conditions as they exist before treatment begins. It is also important to obtain these data so that at the end of each year we may be able to compare the results of our work. Each cow, heifer and bull of breeding age in the herd is examined in detail. The notes are filled in in a loose-leaf health-record book. The outline followed is that originally suggested by Dr. Williams a few years ago, as follows:

Name or herd number of animal.....Date of birth.....
 Has animal been pregnant?.....If she has bred, state number of
 calves produced
 Date of termination of last pregnancy
 Duration of last pregnancy in days.....Was calf alive or
 dead?
 If living, was it healthy?.....Did cow have retained after-
 birth?.....Or discharge from uterus?.....
 Character of estrum, regular or irregular.....

Following this history we arrive at present status which includes:

General condition.....	State of lactation.....
Date of examination	
Right broad ligament.....	Left broad ligament
Vulva	Vagina
Cervix	Uterus
Right ovary	
Right oviduct	
Left ovary	
Left oviduct	
Diagnosis	Prognosis
Treatment applied	
Treatment advised	
Remarks	

There is nothing very new to offer in the line of treatment. The best methods per case will be found in the book about to be published by Professor W. L. Williams of Cornell University. There is therefore no need of going into a lengthy description of a few cases, as each case is an individual problem in itself.

After we know the condition of each female in the herd we try as nearly as possible to group them according to the conditions found; that is, pregnant cows, normal cows ready for service, cows under treatment, and those that are not of proper age. Condemned animals, which are to go to the butcher as soon as their milk supply diminishes to an unprofitable point, should be segregated; this last group may contain animals that are apparent spreaders of infection.

Our examination and notes include remarks relative to any abnormal condition found. On reexamination in two to four weeks such notes are made as refer only to the abnormal condition and the treatment. Every possible detail and precaution is taken in carrying out this work. Haste must be avoided. In this way the history and the present status of each breeding female in the herd is recorded. It is important that each female be examined, as oftentimes those that are thought to be normal by the owner are many times the cases which give us the most trouble. We find many cases of cessation of estrum in females thought to be pregnant. In some cases even after normal parturition the uterus will be atonic and contain considerable exudate. This in itself may prevent estrum and may lead to a more or less chronic infection. The female should be examined and treated if necessary as soon after calving as possible. She will then be ready for service as soon as practicable and often

before the owner is ready to breed her. If she is on test, in a few weeks she will be available for observation, and oftentimes an occasional examination and slight treatment may prevent much future trouble.

Our next consideration is the herd sire or sires. One of the leading gynecologists states that 40 per cent of sterility in the human family is due to the male. In bovines the sire is 50 per cent of the herd. Therefore, the part played by him is of great importance. We have numerous instances backed by clinical data showing the importance of eliminating diseased sires. Impotency in bulls may occur at any age. They may never have been fertile. A diseased bull may manifest nonfertility or decreased potency in different ways—by repeated service to apparently normal females without conception, by a high abortion rate in females that have previously been apparently normal, by characteristic infections following the use of any particular sire, and by abnormalities in the breeding tract noted by rectal and physical palpation.

Microscopically, disease is manifest by abnormal semen and sperm cells. Bull No. 10, a three-year-old Holstein, was used in service on 48 females; all but 2 conceived the first year. The 2 females which did not conceive were recognizably diseased. The following year 2 animals became pregnant to him. At the time of our examination he was completely sterile. Conception followed in all other females to a normal bull. There was apparently no disaster following his use as a herd sire. The cause of sterility in this bull was apparently some derangement in the germinal cells of the testes, all sperm cells being nonmotile and immature. The seprmatic fluid was free from bacteria.

Bull No. 7 has been used for a period of eight months on 43 females; of these 1 was pregnant. As there were 4 other bulls on the farm, I am sure that this fellow was not entirely responsible. This bull is still alive and still infertile and probably always will be. His testes have recently become atrophied and his seminal vesicles enlarged. Many of the remales repeatedly bred to this bull on examination revealed a characteristic cervicitis and endometritis. A large majority of the animals responded to treatment and conceived to other bulls. On the original microscopic examination of this bull the sperm cells were but slightly motile and all were malformed.

Bull No. 19 is a 15-months-old bull bred to 12 imported and 3 domestic heifers, making a total of 15. All females were of an approximate age and all were bred within two weeks and were turned to pasture after breeding. It was noticed when the herdsman began to watch for their return to heat that a number of them were discharging.

On our examination a few weeks later the heifers had a marked purulent vaginitis, with the exception of one domestic heifer. Six of these imported heifers conceived at this first service, although they continued to discharge even under treatment for two months. The other heifers responded slowly to treatment, and with one exception, which was incurably sterile, suffering from salpingitis and pavilionitis, all conceived. We do not know whether or not this one case was due to infection from the bull, because we had not had an opportunity to examine this female prior to this general trouble. On microscopic examination of the bull the sperm cells were normal, but on check bacteriological examination a streptococcus was isolated, very similar to bacteria which had been isolated from the oviducts from sterile cows from the farm from which this bull was purchased. It remains to be seen how many of these six heifers will produce healthy calves. This bull was withheld from service, given proper exercise on a tread power to increase his health and vigor, properly fed, and because of his particular breeding he was not slaughtered but treated with autogenous bacterins for two months. At the end of this time he was placed in service to a grade nurse cow. No apparent bad effects followed the service and pregnancy resulted. After proper bacteriological examination is made, if deemed advisable, he will be bred to a few females, and if no disastrous results follow he may be returned to service.

Bull No. 26 had a history of no calves for the past few months with a high abortion rate in the few females that previously conceived. He was sexually so diseased at the time of our examination that a sample of his semen could not be obtained. His seminal vesicles and epididymis are recognizably inflamed and enlarged. He was removed from the herd and slaughtered.

Bulls that prove to have a lessened potency should be used with moderation. They should be examined every few months.

If their potency decreases, as manifested by decreased breeding efficiency and microscopical examination, they should be withheld from service entirely. It is an important factor in these cases of lessened fertility that they receive proper food and sufficient exercise. They should be in good vigorous condition but should not be fat. At several farms we have had tread power machines installed. They are using them daily, and from the results obtained in several cases we are prolonging the breeding life of these animals considerably. As far as the specific treatment of these cases is concerned, we do not know of anything at the present time we can say that is of value. We have some experiments in hand by way of treatment that seem promising of results. Should these results warrant, the complete data will be presented later.

Our complete examination of bulls is recorded according to the accompanying outline:

BULL EXAMINATION CHART

Name of bull Case No.
 Breed Date
 Date of entering herd Born
 Owner
 Address

A. Breeding history:

1. Extent of previous service
2. No. of calves born
3. No. of individual cows served in herd
4. No. of services: Maximum per day..... Per month.....
5. No. of pregnancies per month.....
6. No. of known abortions

B. First evidence of sterility:

1. No. of known apparently normal females served.....
2. No. of services
3. No. of pregnancies
4. No. of cows bred which conceived on subsequent service to another bull

C. Status præsens:

1. Exercise
 2. Ration
- a. Physical examination:
1. Penis
 2. Testes
 3. Epididymes..... Head..... Body..... Tail.....
 4. Vas deferens
 5. Seminal vesicles
 6. Prostate
- b. Intercourse:
1. Vigor
 2. Orgasm
 3. Protrusion

c. Semen:

1. Amount
2. Consistency
3. Color
4. Bacteriology

d. Spermatozoa:

1. Number
2. Activity
3. Morphology

D. Remarks

We try to bring our calves into the world in a clean way, raise them under the best conditions we know, and breed them only to females which, from all clinical evidence, are sexually clean. All bulls are properly douched before and after service. I firmly believe this is a great help in reducing certain types of herd infection.

Many of us may not be situated in localities where there are at the present time purebred breeding establishments. You might think, therefore, that you have no call for this type of work. In grade dairies where the income is almost entirely from the sale of milk it is just as important, so far as the income is concerned, that they have a good yearly crop of calves as in the purebred herd. Let us consider, then, breeding diseases from an entirely commercial standpoint.

Herd supervision by veterinarians in these more commercial dairies, if properly carried out, is a profitable investment for the owner. Due to the high prices of feeds, labor, etc., the dairy cow of today, in order just to pay for the place she occupies in the dairy, must produce at least 20 pounds of milk daily. The profitable grade cow must maintain at least a 50 per cent increase or 9,000 pounds of milk per year, exclusive of the two months which precede the date of parturition, and she must produce a calf every 12 to 14 months. We are all familiar with the ravages of disease, which impair reproduction in the larger dairies, especially where no methods of sanitation and control are carried out. Oftentimes it will be found that instead of producing a calf each 12 to 14 months the average is 16 to 18 months and in some cases longer. The female of this type then falls greatly below her maintenance supply of milk; she becomes an expense and counterbalances a good producer that may stand beside her.

Many dairymen do not stop to consider why their income

from the number of animals they are maintaining is not larger. They seldom realize the number of boarders they are feeding and caring for. The veterinarian should familiarize himself with problems of this kind and be of assistance to the producer by eliminating the unprofitable animals and advise about those that will soon be unprofitable. Breeding sanitation should be practiced and the individual cases handled according to individual conditions. I will endeavor to formulate the general plan that we carry out with success in dairies of this type that come under our supervision.

Our aim in this work is to arrange the breeding so as to have a uniform number of cows freshening each month, with a few more than the average for the months of July, August, September and October, the most difficult months of the year in this locality to produce milk.

Our first procedure is an examination of each animal with a report in the form shown herewith:

Farm..... Date.....

Cow No.	Milk daily	Date of last calf ¹	Last breeding	Present status ²	Due to freshen	Remarks

¹N=normal; A=aborted; R =retained placenta.

²P=pregnant; PP=possibly pregnant; NP-N=not pregnant, normal for breeding; T=treating.

This tabulation will enable us to know the exact breeding status and milk production of each female each month. If these data, including production, last calving date, date due, etc., are not obtainable, we have to proceed with the information the present caretaker can give, plus existing manifestations, and explain to the owner or caretaker the importance of keeping sufficient records. Milk production charts should be obtained if not already in use, and the daily production of each cow should be recorded.

Our records are kept in a loose-leaf health-record book in which each cow is given a number and a separate page. Cows not in calf are listed, note is made if they are normal and ready for service or if treatment is necessary and what treatment was and is to be given. Of the cows ready for service the poorer producers and short-time animals should be bred first, arranging as near as possible the breeding so that a proportionate number of the herd will be bred each month. The cows that are normal and ready to breed as the proper period approaches are then placed in adjacent stanchions so that they may be more closely watched. They should be turned out for an hour or two each day if possible. This is quite important, especially where cattle are not turned out regularly, as their heat periods may pass unnoticed and thus cause further delay in our breeding work.

The other animals are stanchioned or stabled according to pregnancy, and the treatment is the same as in purebred herds if this can be carried out conveniently. The health record book is posted at our visit, and each night or once each week the owner or herdsman records heat periods, calving dates, premature births, retained placentas, discharges, etc. We can therefore get a brief history of each case without much difficulty and without consuming too much of the owner's time on our visit.

No animal is bred until approved, or until she is clean, normal and ready for service. Many times a separate list of cows to be bred during the month is made, so that there will be no error in breeding females other than those that are apparently normal.

One man is made responsible for all breeding work, including heat dates, dates of service, calving, douching the vaginas of the cows and the sheaths of the bulls.

Work of this kind has proven its value in grade herds. One dairy composed of 125 milking females came under our supervision about 18 months ago. By this method of handling and eliminating the unprofitable cows and with the proper treatment of diseased animals more cases of milk have been produced by this farm during the past nine to twelve months than ever before in the history of the herd from the same number of animals.

The previous year's breeding ratio of 4 services per pregnancy has been reduced to 1.3 services to 1 conception with the use of the same 2 bulls. These bulls were apparently in every

way efficient and healthy on our examination. The breeding ratio per calf is a saving of over three months' time on each calf produced. The abortion rate has been reduced to less than 3 per cent.

Calf raising on many farms is at times a very serious problem. As a rule where the percentage of premature births, retained placenta and metritis in its different forms is high, so is the ratio of calf disease very high, including septicemia, pneumonia, diarrhea and digestive troubles. Very little work has been done by investigators along these lines, although today death from these causes ranks high in the proportionate losses of each herd. Several methods are used in feeding and raising calves. It apparently makes no difference how they are fed, provided they are sturdy, vigorous and comparatively free from infection. Many farmers and herdsman say that they never have any "particular trouble," but if any of these collective infections once gain a foothold he will realize how little he knows about handling these cases. One of our first considerations is the proper sanitary condition, proper stalls, ventilation, cleanliness of the udders of the cows, the utensils used in feeding and storing the milk, etc. After we have checked up on all such conditions we look to the general handling and feeding of the calves.

Professor Williams, after much study, decided on a definite plan for rearing calves. The plan is to remove the calf at birth from its dam, give 30 mls of calf scour serum daily, an enema at birth to remove the meconium, proper care of the umbilicus, and if diarrhea sets in alkaline or weak antiseptic enemas as indicated. All food is withheld for 24 hours, after which time 2 per cent of the body weight in milk is fed twice daily for a few days, gradually increasing the milk as the calf properly digests this and does not evidence any digestive disturbance or a rise in temperature. If the calf's temperature rises above 103° F. and diarrhea sets in, all milk is withheld and 30 to 60 mil doses of calf scour serum are administered and enemas given until temperature drops below 103. The milk is then resumed and the amount increased as the calf can assimilate it without causing another setback. Autogenous bacterins in small doses beginning a few days after birth apparently give some aid in overcoming the infection. I personally believe that where our

infections are very severe, where we have the proper man handling the cases and he does not care how thin his cases get until they are once started, it is a very good plan.

We have had considerable trouble with this calf question on some of the farms under our control. We tried to work out a plan the basic principle of which was suggested by Dr. Frost previous to a paper he gave on the subject at Ithaca. We finally outlined a plan as near to Nature's way as possible and with the least possible amount of work and routine required by the caretaker in carrying it out. Our plan is as follows:

1. Prepare the cow for calving.
 - (a) Clip tail and udder.
 - (b) Seven days before calving thoroughly wash and scrub the hindquarters, tail, udder, genitals, etc., with soap, water and brush. Rinse with clean water and dry.
 - (c) Sponge hindquarters, tail and genitals daily with a mild (1 or 2 per cent) disinfectant of lysol, creolin or some other good product.
 - (d) When about to calve remove to disinfected stall in which there is clean, dry straw.
2. Dip the navel and cord in iodine daily for three days.
3. Allow the calf to nurse its dam or a safe "nurse cow" at will for four to eight weeks.
 - (a) If the cow is to go on test and the calf is to be weaned soon, allow it to nurse its dam for three days. When weaned feed in sterile pail and use the first portion of the dam's milk three or four times per day, depending on the number of times she is milked. Continue this feeding for eight to ten weeks. After ten weeks, if desired, gradually change to heated milk, either whole or skimmed. Bring the milk to a boil and allow to cool in a natural way under cover. Feed at 96° to 100° F.
4. Provide a temperature card and take and record the temperature three times a day (morning, noon and night) for a week to ten days.
5. If the calf develops a temperature of 103° F. and appears sick, remove to adjoining stall and reduce the feed. Inject 15 c.c. of serum every three hours. On the following day inject 30 c.c. of serum morning and night. As soon as the temperature develops and calf appears sick give 1 quart of warm water containing 1 heaping tablespoonful of soda bicarbonate and 1 teaspoonful of aromatic spirits of ammonia morning and night one hour before feeding. Subnitrate of bismuth in 1-ounce doses and salol in dram doses (60 grains) or saola in 1-ounce doses may be given as indicated 3 times daily.
6. As soon as calf shows symptoms of sickness, acid feces and scours, discontinue milk and substitute 1 pint to 1 quart of warm barley water 3 times daily. Continue serum and give stimulants as indicated, and resume milk ration when acidity subsides and feces become normal, as soon as calf can take it with safety.
7. When feces become normal gradually discontinue soda bicarbonate and aromatic spirits of ammonia and resume normal feeding.

Barley water. Take 3 quarts of ground barley; place in a 10 or 12 quart pail, and add boiling water until the pail is nearly full.

Stir for a few minutes and allow to settle and cool. Pour off the clear fluid and use as directed.

From this method of handling we have been and are getting good results. One point especially where our calves are having some trouble is to feed a uniform per cent of butterfat in their daily milk. Frequently even older calves can not utilize all the butterfat in Guernsey or Jersey milk, especially where there is digestive disturbance or weakness. As soon as the calves are weaned from their dams or nurse cows they should be fed for a few weeks a thoroughly safe, pasteurized milk standardized to about 2 per cent fat. When they are growing well and get a good start gradually substitute pasteurized skim milk with suitable grain and roughage diet.

Hemorrhagic septicemia is more prevalent in some localities than has been previously recognized. On all calves at farms under our supervision, if any individual shows a rise in temperature, cough, increased vesicular murmurs, it is immediately given a dose of hemorrhagic septicemia bacterins plus serum. Daily doses of serum are given until recovery seems assured. All calves in the herd not having temperature are given the bacterin. In this way we have been able to check apparent outbreaks without the loss of a case, whereas in previous epidemics at some farms we lost a number. Experience has taught us not to wait until we have several calves sick with pneumonia, but to start with our bacterin and serum just as soon as our original case is found. Symptomatic treatment is given as conditions warrant.

After our calves reach the age of six weeks, we believe they are out of most danger, although this is not always the case. When the feces mature they are penned according to size and sex. They are grown with the aid of the calf ration previously mentioned, with fine leafy hay and skimmed milk, the quantity depending on size and age. In other words, they are grown rapidly so that they may be as large as possible when 15 to 18 months of age. A well-grown animal of this type can be bred or used for service much earlier than the animal fed on a limited ration. This will enable them to freshen, barring disease, at 25 to 28 months of age. In this way we will be getting an early income from the new generation.

Herd efficiency should go hand in hand with the increased

value of livestock and better animal husbandry. Herd efficiency is dependent on the control of disease, maximum production and reproduction. Dairy sanitation, breeding hygiene, normal genitalia and the mating of sound individuals are milestones along the road to success. The three most important points are: Proper attention to all breeding females by way of cleansing the genitals after parturition; careful manipulation and examination of ovaries, uterus and external genitals before breeding; with the bull, proper douching, feeding and exercise. Only sound, vigorous and prepotent sires should be maintained in a herd. Strong, healthy, well-grown calves should result. All of these are conducive to better livestock and better agriculture.

THE INTERNATIONAL ANTHRAX PROBLEM

At the international labor congress in Geneva, Professor Armstrong, Australian employers' delegate, according to the London correspondent of the *Journal of the American Medical Association*, submitted a resolution that the committee considers that the question of the universal and compulsory disinfection of wool and hair infected with anthrax, in its humanitarian aspects, has not yet been sufficiently studied to justify the conclusion of an international convention; that the conference should request the governing body of the international labor office to appoint an advisory committee to which the government of France, Great Britain and Germany, as representing the users, and Australia, India and South Africa, the producers, should be invited to send representatives, and that this committee should be invited to examine the question in all its bearings and present its report to the conference in 1923; that the chairman of the proposed advisory committee should be appointed by the British government; that the inquiry should at first be mainly by correspondence; that when meetings of the committee become necessary, they may be summoned by the chairman in London, and that co-operation of a representative from the United States be invited. While accepting disinfection as the only effective means at present of protection of workers, the committee regards the eradication of the disease among animals as the ultimate solution, and is of the opinion that the advisory committee should be instructed to report on this subject.

TRIBUTE ON BEHALF OF MCGILL VETERINARY GRADUATES TO DEAN McEACHRAN¹

By W. REID BLAIR

New York, N. Y.

IN ACCEPTING the honor of representing Dean McEachran's "boys of the Old School" on this occasion I did so with feelings of misgivings, since I fully realize my limitations to express adequately my own feelings, to say nothing of those of my colleagues. I wish I might have had the training of a lawyer to aid me in this task. Every man has wondered some time in his life where his lawyer friends get all their words, many of them useless and superfluous perhaps. The difference in speech between the ordinary human being and a legal luminary is illustrated by the following: If a man were to give another an orange, he would simply say: "I give you this orange." But when the transaction is entrusted to a lawyer to put into writing he adopts some such form as this: "I hereby give and convey to you, all and singular, my estate and interests, right, title, claim and advantages of and in said orange, together with its rind, juice, pulp and pits, and all rights and advantages therein with full power to bite, cut and suck, and otherwise eat or give the same away, with or without the rind, skin, juice, pulp or pits, anything hereinbefore or hereinafter or in any other deed or deeds, instrument or instruments of whatever nature or kind whatsoever to the contrary in any wise notwithstanding." But what I may lack in verbosity I hope to make up in expressions of loyalty and good will.

It is indeed a happy augury to note the growing tendency to honor our men who have distinguished themselves in whatever field they may have labored, during their lifetime, rather than to wait until our friends pass over the silent river before expressing our appreciation of their services to our profession. It was with this thought in mind that the gathering tonight had its chief inspiration.

Dean McEachran, the men gathered here tonight truly represent that great body of "your boys," scattered throughout

¹Remarks at a complimentary dinner to Dr. Duncan McEachran at the Ritz-Carlton Hotel, Montreal, Canada, October 13, 1921.

the world, and they come for the express purpose of registering their appreciation and esteem for you, and to testify to the fact that you, too, had an important part in establishing McGill's fair name at home and abroad. While the school which you founded and presided over for so many years is dead, still we wish you to know that the work which you and your colleagues began, more than half a century ago, will continue to stimulate others to greater effort in extending the principles for which you ever contended, in the prevention and control of infectious diseases.

To have that faculty to inspire a body of students for a long term of years is certainly an achievement which implies the possession of more gifts than one. These must be personality supplemented by solid attainments. And then to magnetism and knowledge must be added that ungrudging eagerness to be helpful, which renders the teacher capable of maintaining discipline at all times. It is through the possession of all these qualities and attainments that Dean McEachran has endeared himself to his students and communicated to them his own high sense of that standard which should guide the practitioner of veterinary medicine. Dean McEachran never looked upon the work of the classroom as a task, but rather as an opportunity for imparting his own zeal and wholeheartedness, along with his rich store of learning.

The institution over which our honored guest of this evening presided for thirty-seven years consistently endeavored to reach and maintain a high standard of veterinary education, and it was a matter of deep regret, not only to its many graduates, but to all those interested in veterinary science on this continent, when, largely through lack of financial support, it was compelled in 1903 to close its doors.

It would be hard to overestimate Dean McEachran's influence for good in the maintenance of the friendly relations between the members of our profession on both sides of the international boundary. Many American graduates can testify that it was no handicap to have it known that they were graduates of Dean McEachran's school of McGill University.

Dean McEachran was able to impress his ideals and aspirations upon the undergraduates from the first moment of his contact with them. The hold which he gained at the outset he has

preserved unbrokenly, until, with an ever-widening range of effectiveness, his graduates have carried his honored name and influence to all parts of the world.

His graduates have distinguished themselves in all human endeavors, in war as well as in peace, as administrators, teachers and practitioners. Many have become distinguished practitioners of human medicine, and in a great measure their success as diagnosticians can be attributed to their prior study and practice of veterinary medicine. Many of his graduates in administrative capacities have brought zeal and intelligence to bear in sanitary affairs, and have over and over again demonstrated what veterinary science can do to safeguard the health of our stock and the people alike.

It is generally conceded that the value of scientific discoveries and deductions is largely dependent upon their authorship. When new results are brought to our attention the first inquiry is for the name of the author, and several factors enter into our judgment of his work; but the primary consideration is the man. Unripe minds will naturally produce pseudo-science, and much so-called science is being forced upon our attention today that is unripe and undigested.

In these days of fortune making and of chasing the almighty dollar we need a renaissance of the spirit which inspired and upheld the fathers of our profession in their strenuous labors, both scientific and practical, that have laid the foundations of modern veterinary medicine.

We sometimes hear in these days of men who look upon the present and future veterinarian with gloom; but what must have been the hardships and discouragements of such men as Dean McEachran, Liautard, Law and Smith in combating the influence upon the minds of the people of their day of such imaginary diseases as "wolf in the tail" and "hollow horn," when every community was infested with ignorant "hoss doctors" with their cure-alls for real and imaginary ills of the animal kingdom?

One can not contemplate the development of the institutions that these men founded without a feeling of admiration for their achievements and a conviction that the phase of education which they typify is destined to become more and more important in America.

It has been my good fortune to have known each of these men, to have known something of their ambitions and aspirations to protect and serve the livestock interests of our countries, and to have been thrilled by the kindly inspiration of their eventful lives. Each of these men laid stress upon the thought that the field of veterinary medicine is not a commercial one, but one of service in promoting and protecting the livestock interests of the community. The names of these men by their achievements are indelibly written in the records of the progress of veterinary medicine. Time has indorsed their early judgment in regard to the necessity for rigid inspection and quarantine laws, for the protection against infectious diseases among horses and cattle, and particularly the need for dairy laws for the protection and assurance of a wholesome milk supply for the general public. While these laws were often bitterly opposed in the beginning, time has shown the beneficial wisdom of them, and they are now universally acknowledged.

While the older practitioners had their problems, dealing with quackery and ignorance, the veterinarian today is frequently confronted with problems of vital importance to the good name of our profession. Not infrequently the young veterinary practitioner starts out in practice as a specialist by aping that real pest of the medical profession who opens spacious and elaborate offices and waiting rooms with nurses and attendants, and an all-pervading glitter of white enamel, mechanical novelties and shining metal work, in an attempt to impress his clientele by costly stage effects. He seems to forget, and his clients still oftener fail to realize, that what he really has for sale resides in his own cranium, and that mere style, atmosphere and scenery are poor substitutes for knowledge, experience and technical proficiency. The really conscientious veterinarian's regard for his good name and high personal character should be, and is usually, quite as dear to him as his professional reputation.

To those who feel pessimistic at the outlook for the veterinarian of the future, I would recommend the study of the lives and achievements of that splendid group of pioneers who came to this continent some 55 or 60 years ago, to become the founders of veterinary education in America. With what amazing industry, versatility and keenness of intellect did they unfalteringly cultivate the field of veterinary science! With what devo-

tion and beneficial results did they give of their time and abundant knowledge to the service of the public and of the profession! It is due to the work of such men as Dean McEachran that the public has been convinced that the veterinarian and the veterinary profession are entitled to a better position in the public mind. And now we all realize that the public is willing to accord to the veterinarian and the veterinary profession the position which they demonstrate their ability to occupy. It lies within the province of each veterinarian to decide whether he is to practice veterinary science as a profession or merely as a trade.

Let us then look with pride upon the achievements of the past, and face the future with courage and hope that the profession will yet attain that state of perfection where it is universally recognized as truly scientific, a benefit to mankind, and also indispensable in its economic importance to the general welfare of a progressive citizenship.

DR. ALBERT HASSALL HONORED

Dr. Albert Hassall of the Zoological Division of the Bureau of Animal Industry has recently been notified that the Steel Memorial Medal for 1921 has been awarded to him by the Council of the Royal College of Veterinary Surgeons. This medal is awarded at intervals of 3 years on the recommendation of the Honors and Prizes Committee as an award for scientific or literary work of merit in connection with the veterinary profession.

Dr. Hassall has been in the Bureau of Animal Industry for the last 35 years, and in the course of that time, in addition to publishing numerous papers on parasitology, has built up an Index Catalogue of Medical and Veterinary Zoology which is the most complete work of the sort in existence. The author catalogue was published as a joint work of Dr. Ch. Wardell Stiles and Dr. Hassall as Bureau of Animal Industry Bulletin 39, and the subject catalogues, covering the cestodes, trematodes and nematodes, have been published by these authors as bulletins of the Hygienic Laboratory, U. S. Public Health Service. These publications constitute very valuable reference works which are in great demand in this country and abroad by zoologists, veterinarians and physicians.

ADDRESS AT MCGILL VETERINARY REUNION¹

By DUNCAN MCEACHRAN

Emeritus Dean and Professor, Late Faculty of Comparative Medicine, McGill University, Montreal, Canada

IT IS UNNECESSARY for me to say that I had much pleasure in accepting your kind invitation to be present here tonight at this great festival of graduates of McGill. It always gives me pleasure to meet old friends, especially old pupils, under such happy circumstances as have brought us together tonight. It is well known that the Maes are all clannish, and it would not have surprised me a bit if in this gathering of the sons of Old McGill some one had got up and asked us to drink that very old but extremely modest toast, "Here's to oor ain sel's—wha's like us?"

I remember on a former occasion I attended a somewhat similar gathering, though on a smaller scale, on the 19th of January, 1896, which was reported at the time in the *Boston Globe* as follows:

"One of the most enthusiastic and enjoyable occasions and one of the finest sets of men to meet in Boston was the Massachusetts alumni of the Department of Comparative Medicine of McGill University which met at the Quincy House last night. They were all healthy, hearty looking men." Then followed some personal remarks about myself, so flattering that my Scotch modesty prevents me from repeating them. You must imagine them. Then followed a reference to "the ease and dignity with which he carried his years." (I was a young fellow then, and I am not an old fellow yet. That reporter should have known how easy it was to be easy when being entertained in Boston.) Twenty-five years ago, the report went on to say that "the respect which his 'children,' as he called them, showed him was pleasant to see."

If I mistake not, I believe that association, which had been in

¹ This is Dr. McEachran's response to addresses by Drs. V. A. Moore and W. Reid Blair at a dinner given in his honor at the Ritz-Carlton Hotel, Montreal, October 13, 1921, by former graduates and the late Faculty of Comparative Medicine of McGill University, during the McGill centennial celebration. A report of the dinner was given in THE JOURNAL for December, 1921, page 388. Dr. Moore's address was published in THE JOURNAL for February, 1922, page 625, and Dr. Blair's appears in this issue.

existence for several years before that meeting, was the first society of McGill graduates in Massachusetts. As a matter of fact such meetings were held by the graduates of the Montreal Veterinary College years before we became a Faculty of McGill.

It is very gratifying to meet tonight such a representative gathering of graduates, many of whom traveled more than 2,000 miles to do honor to their Alma Mater, represented by my humble self. How true it is that history repeats itself. That reporter if present tonight would compliment himself on his true realization of the quality of the men of whom he wrote twenty-five years ago.

Institutions of learning may be built, equipped and endowed by the large-hearted liberality of benefactors, yet if their graduates forget their duties to Alma Mater enduring progress can not be made. I am not going to presume to lecture in this after-dinner speech on these duties, yet one can not help taking advantage of such an opportunity of speaking to such a representative gathering as this, to say a few words on this subject. Graduates should feel that they are part of the University, that they ought to continue to take an active interest in her affairs and have their views on all important matters properly expressed by their representatives. Each individual graduate should ever keep before him the feeling that his professional standing, his research work and contributions to science reflect credit on his college.

I was asked once by a former Chancellor of McGill, Lord Strathcona, for my opinion as to what was the stimulating influence that impelled the young Scotchman to get on in the world. My reply was: "His love for his parents, especially his mother, the great joy she would feel in his success in life, and his desire to contribute of his earnings to the support and comfort of those who did so much for him." Such feelings should actuate every graduate to give Alma Mater joy in his success, and to promote her progress in some of the numerous ways which circumstances open to him.

Referring to "Old McGill"—the prefix "old" is in one sense at least no longer applicable. The visitor to McGill who has not been there for ten years will be amazed at the newness of everything. Noble piles of new buildings, thoroughly equipped laboratories, well-stocked libraries and other essentials of uni-

versity equipment; the number of professors, lecturers and demonstrators has been greatly increased, especially in the medical, arts and applied science faculties and agriculture. The Medical College has been rebuilt and enlarged, and now without doubt it is one of the most complete medical colleges on this continent, thanks to the princely liberality of her numerous benefactors. Much, however, yet remains to be done to make McGill as complete as we hope to see her become. Surely the day is not far distant when the branch of the medical science which deals with the prevention of disease in food-producing domestic animals, on which public health so much depends, and which affects materially one of Canada's greatest commercial industries, will be restored and endowed in such a manner as will enable the Faculty of Comparative Medicine to carry on its work in a manner proportionate to its importance scientifically and practically. I can not refrain from remarking that one of the greatest blunders ever committed in the management of McGill University was allowing that Faculty to close its doors for want of necessary financial support. However, we will "let the dead past bury its dead," and hope that some day the blunder will be remedied to the University's own advantage.

Think of the good work so well done and so much appreciated by the whole United States as is done by Cornell University. It is surely a great honor to us for Cornell to send as her delegate the able head of her veterinary faculty to represent her at the great McGill Centennial now in progress, and more especially to deliver the able address to us to which we have just listened.

The importance of comparative medicine and the value of comparative research work to medical science are well understood today and were well illustrated in 1901 at the British Congress on Tuberculosis, of which I had the honor of being a vice-president, when Prof. Robert Koch in the section of animal diseases, injudiciously and unsupported by sufficient data, announced that "tuberculosis could not be transmitted from man to animals or vice versa," throwing the whole medical world into consternation in view of the unanimous concurrence in the belief among medical and veterinary scientists generally that the communication of bovine tuberculosis by means of milk especially, and also by flesh, was responsible for the prevalence of consumption in human beings, a belief which constituted the very basis of the

congress. Who, let me ask, were called upon to combat his announcement at that historical assembly of medical scientists, comprising as it did nearly 3,000 members representing every civilized country in the world? First that great luminary in medical science, the chairman, Lord Lister; following him the late Prof. Nocård, the leading veterinarian of France; Prof. Bang, at the head of the veterinary profession in Denmark, and Prof. McFadyean, Dean of the Royal Veterinary College at London.

I will not detain you further with the subject, but would call your attention to a paper containing most advanced ideas and logical reasoning entitled "Knowledge and Practice," by the esteemed Harvard professor, C. S. Minot, in which he says: "Medicine is destined to become comparative because it must advance. The wise action for us is to facilitate that advance." And I would also call your attention to an equally advanced discussion of the same subject by another illustrious Harvard professor, Theobald Smith, entitled "Comparative Pathology: Its Relation to Biology and Medicine," in which he says: "The economic as well as scientific importance of animal diseases is so great that the National Government could with profit maintain a trained expert for every one of the plagues that decimate our domestic food-producing animals. It could afford to give him all the facilities for experiment and study and travel necessary to keep our knowledge of that particular disease in this and other countries up to the high-water mark of medical science."

An admirable address by the late Rt. Hon. Joseph Chamberlain, delivered as Chancellor of the Birmingham University, showed that Mr. Chamberlain was not only able to guide the affairs of state as he did in connection with the South African rebellion and to defend himself against the attacks of foreign politicians, but to formulate university policy on the broadest lines, and a clear appreciation of what an up-to-date university ought to be. Mr. Chamberlain knew the high ideals of university work, university aims and standards which were suitable for the state of society a hundred or hundreds of years ago, when few entered their precincts but the sons of noblemen and men of wealth and property, and even in Britain today where their halls are largely filled from the families of wealthy landed proprietors, millionaire capitalists and rich merchants: but he knew

that we are living now in a utility age, an age when the sons even of millionaires are brought up to some business or profession by which they can earn their living; an age when it is honorable to work and dishonorable to eat the bread of idleness; hence Mr. Chamberlain's sound common sense suggested to the Senators of the new University to "start with the belief that here we are going to combine theory with practice and to see that in our University we shall combine both in one course of instruction with due regard to the needs of our time and district."

In visiting several of the universities of Continental Europe I was particularly impressed with the excellent opportunities students enjoyed for combining with the higher branches of learning a thoroughly practical course of instruction to prepare them for practical life work. For this reason graduates of British and American universities have flocked thither for post-graduate work. It is to be hoped that the day will come when McGill will establish post-graduate courses which will attract not only her own but graduates of other universities as well.

Gentlemen, in conclusion let me say that your own Faculty of Alma Mater, as you all know, was based on similar high ideals as recommended by these noted men, as far as possible for us to combine scientific instruction with practical work, and to this I attribute the gratifying success of each one of this large gathering.

When I undertook the organization of a veterinary school, suggested by McGill's greatest scientist and Principal, the late Sir William Dawson, Major Campbell of St. Hilaire, then President of the Board of Agriculture for the Province of Quebec, through their influence Dr. George Campbell, Dean of the Medical Faculty of McGill University, and member of that Faculty, became much interested, and arranged for lectures to commence in their own lecture room in Cote Street. Without the assistance of the Medical Faculty we could not have even attempted a beginning. It is needless for me to say how I appreciated their aid, especially from the Professors of Chemistry, Dr. Girdwood; Physiology, Dr. Fraser; Dr. Craik, Dr. Mills, Dr. Osler, Dr. Wilkins, Dr. James Bell, Dr. Blackader, Dr. Ruttan, Dr. Drake, Dr. Stewart, Dr. Morrow, Dr. Adami and others. I look back with pleasure and satisfaction on my association with these professors, as well as with Dr. Baker, Dr. Charles Me-

Eachran, Dr. Lyford, Dr. Bruneau, Dr. Daubigny and other members of the veterinary profession and of our own staff.

Let me conclude by thanking you for this crowning compliment of my life, for which I can not find language adequately to express my feelings of appreciation.

MEXICAN DAIRYMAN BUYING HOLSTEINS IN CALIFORNIA

A new market for California Holsteins is opening in Mexico, and buyers are canvassing the San Joaquin Valley, which they believe has the nearest climate to that below the border, for purebred and high-grade cattle. Carlos Arizao is at present in Stanislaus County, dealing with the Holstein Breeders' Association for a large number of cattle. He is asking for about 40 or 50 heifers a month for six months, and 5 or 6 registered bulls for each month's lot of females.

Arizao reports a great shortage of dairy cattle in Mexico, and says California must be looked to for the supply, as Eastern cattle do not acclimate well in his country, becoming subject to the pests peculiar to Mexican cattle. He is taking out a carload of heifers and bulls as a trial, and if they do as well as he expects, he will follow this order with many more. He believes Mexico will furnish an outlet for all the Holstein cattle California can produce in the next five or possibly ten years.
—*Sacramento Bee*.

Statistics of livestock in Germany on December 1, 1920, show increases in all kinds during the preceding year. There were 16,789,844 cattle, a gain of 472,516, and 3,581,380 horses (not including cavalry horses), a gain of 116,146. Hogs showed an increase of 2,631,587, sheep 798,772, and goats 311,862.

The Belgian Ministry of Agriculture has arranged to give a series of free public courses in horseshoeing in 1922. The courses are in charge of official veterinarians and will be held in twenty-four localities. Certificates will be issued to persons who pass a satisfactory examination in theory and practice. The Government has a regular school of horseshoeing at Brussels.

DEDICATION OF NEW COLORADO VETERINARY HOSPITAL¹

By GEORGE H. GLOVER

Colorado Agricultural College, Fort Collins, Colorado

"A consummation devoutly to be wished." It has been consummated; the first of the permanent buildings for the veterinary college is completed. The veterinary hospital and anatomy laboratory, which so long dwelt in the realm of the imagination, is at last a reality. It has been built for a specific purpose, and conforming in every detail to the needs of the special work for which it was designed, it can never appropriately or conveniently be used for any other purpose. For this reason the dedication of this building for the special work for which it was designed is altogether fitting and proper. It can best be dedicated to the conservation of the animal wealth and the public health.

In making the following abstract statements, I have no fear of successful contradiction. Real wealth comes primarily from the soil. Animal husbandry is the major part of agriculture. We are losing five per cent or more of our animals from disease. Microbic diseases are every year becoming more formidable. Eternal vigilance is necessary to guard the animal food supply of an ever-growing population. Many diseases of the lower animals are communicable to man. Inspection of foods for human consumption, more especially meat and milk, is in its incipiency. Less than one-half of the meats consumed in this country are subject to any sort of inspection. The public health should be of first consideration. This is naturally the work of scientifically trained veterinarians.

Human institutions are more or less transient and the history of nations "hath but one page." Things of human artifice may perchance survive one or many generations. Medicine, as a science and an art, is based upon the eternal verities. It must be as enduring as the present order of animal creation. So long as the life of one species depends for its existence upon the death of another, must animate creation suffer pestilence and the danger of extermination. The science of medicine is destined to

¹ Address at the dedication of the new veterinary hospital at the Colorado Agricultural College.

endure so long as there remains a human being to apply the art. In the realm of science, we have as yet scarcely scratched the surface of Nature's hidden secrets. In the practice of medicine empiricism is still to be reckoned with, and there is evidence on every hand of a lingering faith in the magic power of the mystic wand. However, it is doubtful if any similar epoch has witnessed a greater acquisition of accurate knowledge, respecting any branch of human endeavor, than has the science of veterinary medicine in the last two or three decades.

Veterinary medicine as a branch of one of the three learned professions had a tardy but auspicious beginning. It was born of necessity. It had its inception in the absolute need for organized and intelligent supervision and conservation of the animal wealth. Its early devotees in this country were remarkable men in many respects, and this was indeed fortunate, for a profession, like any other organized unit of society, is known by the company that it keeps, by the character of those who espouse its cause. These men gave this embryo profession a certain caste, an ethical, moral and social standing which has not been easy at all times to emulate.

The veterinary medical profession will ever honor and will never fail in its encomiums for Alexander Liautard, Duncan McEachran, Andrew Smith, D. E. Salmon, James Law and M. Stalker, the pioneers who "blazed the way." It was during the time of these men that the seeds of the veterinary profession were sown in America. The first seeds planted germinated in the environment of the private schools. The first veterinary colleges had many of the characteristics of trade schools. With meager educational requirements for matriculation, and with courses extending over two terms of six months each, the limited time must necessarily have been devoted to the art and not the science of veterinary medicine. Emphasis was placed on the how and not the why of things. The early colleges were privately endowed and were made to meet a popular demand. In the evolution of veterinary medicine, they blazed the way and filled their niche creditably.

The first land-grant college to offer a course in veterinary medicine was the Iowa State College, under the able leadership of Dr. M. Stalker. There are now only 13 fully recognized veterinary colleges in the United States, and one of these is a

private school. The State colleges of South Dakota and Wisconsin have recently taken steps to inaugurate professional courses in veterinary medicine.

This veterinary college, like all of the others, is subject to close scrutiny by the United States Department of Agriculture and the American Veterinary Medical Association. They make annual inspection of our work and facilities for teaching, and we must conform to their standards. There is but one veterinary college in the United States that now stands on the ragged edge of recognition, and it is bending every effort to meet the requirements. No half-baked veterinary colleges, or veterinary diploma factories, are tolerated in this country. The educational standards are now as high as they were in human medicine but a few years back, and the spread between the two is becoming less conspicuous. Veterinary medicine has followed the lead of its sister profession and made a commensurate progress. It has added materially to the economic wealth of the country. It has courageously met its responsibilities in the World War as well as in civil life.

The spirit of commercialism seems to dominate everything these days, and the learned professions have not escaped its blighting influence. It is manifested in the emphasis which is placed upon the diploma and so little appreciation of what it should represent. This places the diploma in the same category with fiat money, which has no collateral behind it. The get-wise-quick idea is in harmony with the spirit of the times. To the unsophisticated youth it looks like a good business proposition to get a diploma in the least possible time, which shall represent an optimum of vantage in securing a job, with a minimum of time and effort. Education for its own sake does not appeal, and the get-wise-quick fallacy is twin sister to the get-rich-quick mania, which appears to be more especially an American characteristic.

The profession of veterinary medicine rests upon a sound educational basis. It has profited by the early mistakes of its sister profession.

We deem it of the utmost importance that we persistently impress upon the minds of our students the fundamental thought that the moral of this profession will stand or fall before the bar of public opinion according to the character and citizenship

of its devotees, individually and collectively; that after all, the standard of public appreciation does not rest entirely upon specialized training, professional efficiency or aptitude; that while the client for the time being rates the man according to the professional services rendered, the banker, the merchant, and citizens generally are rating him according to other standards.

The first thought of educators should be character and citizenship, then to come the specialized training that will enable the recipient to occupy a more satisfying and profitable station in life, where he may render the greatest possible service to his fellow men.

The new veterinary hospital and anatomy laboratory is in every respect appropriate to our needs. Its usefulness has already been reflected in the quality of our work. It is now up to us to prove that we are worthy of such generosity on the part of the State.

“About 99 per cent of the more than 10,000 cattle so far tested for tuberculosis in Oregon are free of the disease, according to preliminary announcement of the results of a survey being made by the agricultural college extension service.”—*Pacific Homestead*.

“The elixir of long life consists of soured cow's milk, cheese made from sheep's milk, and white bread, according to Dr. Sandowein, professor of physical chemistry at the University of Kiev. He has discovered a village in the mountains near Temir Khan Shura, the new capital of the Daghestan republic, where 18 men out of a total population of 120 are aged more than 100 years.”—*Butter, Cheese and Egg Journal*.

Breeder's Gazette says of the International: “The Government display was probably the best agricultural exhibit ever sent out from Washington, showing methods of swine feeding, management and sanitation that caught the eyes of hog men. The value of a purebred sire was brought out in a forceful way, and also better methods in feeding by two live steers. An elaborate and highly edifying exhibit of materials, specimens, pictorialized facts and graphic literature was made.”

THE FIFTH MEDICAL CONGRESS OF CUBA, WITH SPECIAL REFERENCE TO THE VETERINARY SECTION

By A. EICHHORN

Pearl River, New York

Delegate of the American Veterinary Medical Association

IN A SPECIAL SESSION of November 10, 1921, the National Veterinary Association of Cuba decided to request the American Veterinary Medical Association through its President to appoint a delegate to the Fifth National Medical Congress of Cuba which was to meet in Havana from the 11th to the 17th of December. The Veterinary Association requested the organization of the Congress to consider the delegate of the American Veterinary Medical Association as a guest of honor of the Government, with all the prerogatives and honors extended to the other delegates from foreign countries who were invited to attend the sessions of the Congress. Therefore the delegate of the American Veterinary Medical Association was appointed as an official delegate of the Congress and given not only the usual honors but also the usual diplomatic courtesies.

President Kinsley delegated the writer to represent the American Veterinary Medical Association at the Congress, and the writer desires to take this opportunity of extending his appreciation for this privilege, which afforded a most excellent occasion to meet the leaders of the Cuban medical organizations, both professionally and socially.

The veterinary profession was represented by a delegate only from the United States, whereas other branches of medicine had representatives from France, Mexico, the United States and the Central and South American countries. The presence of these official delegates tended to make the Congress somewhat international in character; and in considering the many official functions which were arranged by the Congress it was apparent that the Government of Cuba has given not only official recognition but also financial aid to the Congress.

It would require a very lengthy paper to report the Congress in full, but I can not refrain from mentioning particularly the

splendid social functions given on the occasion to the members of the Congress and the delegates by the President of the Republic in the wonderful new palace; the banquet held at the Tennis Club, one of the most exclusive clubs in Cuba; the dinner of the President of the Congress to the delegates from foreign countries; the luncheon of the French delegates to the other delegates and specially invited guests of the Congress, and the dinner of the foreign delegates to the officers of the Congress. Aside from these functions there were numerous other entertainments. The writer especially desires to express his sincere appreciation to the veterinarians of Cuba, who, individually and collectively, did everything possible to make our stay in Cuba a lasting memory.

No doubt a large share of the credit is due to Dr. Jose A. Presno, President of the Fifth Medical Congress, and Dr. Francisco M. Fernandez, Secretary General, for their untiring efforts. The Congress was most splendidly organized and the professional program was carried out with great precision and in minutest detail.

The Congress was made up of the sections of General Medicine, Surgery, Hygiene, Demography, Legal Medicine, Ophthalmology, Pharmacy, and Veterinary Medicine. Each section held at regular time the various sessions, two sessions being provided for Veterinary Medicine.

The President of the Veterinary Section was Dr. Francisco Etchegoyen, the Director of the Veterinary School of Havana, who deservedly has the highest esteem of the representatives of the veterinary profession, and who, aside from his personal charm, possesses great learning and comprehensive knowledge of the various branches of veterinary science.

Dr. Angel Iduate, who has been for many years the Secretary of the National Veterinary Association, acted also as Secretary of the Veterinary Section. His amiable personality and great tact have endeared him to the veterinarians of Cuba.

PROGRAM OF VETERINARY SECTION

The papers presented before the Veterinary Section were as follows:

A Undefined Disease of Cattle. Dr. Alberto Recio.

The Country that Does Not Modify Periodically Its Sanitary Legislation and Regulations for the Medical Professions Will Find Its National Wealth Ruined. Dr. Francisco Etchegoyen.

Without Proper Legislation There Can Not Exist a Thriving Cattle Industry. Dr. Bernardo J. Crespo.

Avian Spirochetosis in Cuba. Dr. Angel Iduate.

Ten Years' Experience with Hog-Cholera Serum. Dr. Virgilio Benedicto.

Frequency of Canine Nephritis and the Possibility of Error in Diagnosis of Rabies. Dr. Clodomiro Diaz Silvera.

Immunity in Hogs Inoculated for the Production of Virus. Dr. Anibal Hernandez.

Necessity of Sanitary Police. Dr. Francisco A. M. Valdivieso.

Anthrax in Cuba and Statistics. Drs. Clodoaldo Arias and Angel Iduate.

Diagnosis of Glanders by the Ophthalmic Mallein Reaction. Dr. Juan Sanchez Mouso.

Contribution to the Study of Diagnosis of Glanders by the Intra-dermal Mallein Test. Dr. Jose Valdes Ruiz.

Deficient Legislation for the Control of Glanders and Tuberculosis. Dr. Jose Tablado Fuentes.

Failures Attributed to Hog-Cholera Serum through Diagnostic Errors and Possibilities of Avoiding Them. Dr. Clodomiro Diaz Silvera.

Ticks: *Boophilus annulatus* and the Australian Tick in Cuba, and Advantages from their Eradication. Dr. Francisco A. M. Valdivieso.

Statistics on Diseases of our Smaller Domestic Animals. Dr. Francisco Etchegoyen.

Papers by Drs. Serafin and Antonio Martinez.

The importance of the Buzzard in the Propagation of Diseases in Cattle. Dr. Luis M. Martinez.

The Value of the Veterinarian in the Improvement of Livestock. Dr. A. Eichhorn.

The papers were of the highest character, and the discussions which followed the reading of the papers were very active, serious and thorough. About forty veterinarians attended the sessions, and the writer was well impressed with the professional training and high character of the representatives of our profession in Cuba. Many of the veterinarians speak or at least understand the English language, and quite a few have graduated from American veterinary colleges. The writer met three graduates of Pennsylvania, two of the New York-American Veterinary College, two of Kansas City and one from the United States Veterinary College.

VETERINARY PROGRESS IN CUBA

The development of the veterinary profession in Cuba is of very recent origin. Prior to the attainment of the Cuban independence there were practically no trained veterinarians in Cuba. Therefore it is a great credit to the country and to the veterinary profession that in the few years they have succeeded in establishing a record which deserves the highest commendation. Up

to a few years ago the Government had no veterinarians in its employ. With the appointment of Dr. Bernardo J. Crespo they took the initial step in organizing a Bureau of Livestock Industry. With his wonderful organizing ability and untiring efforts Dr. Crespo has already a good nucleus for an effectively working Bureau of Animal Industry, and he hopes that in the near future he will succeed in building up an organization in Cuba along the line of the activity of the United States Bureau



Dr. Bernardo J. Crespo, Chief of the Bureau of Animal Industry
of Cuba

of Animal Industry. He is striving to obtain laws upon which rules and regulations might be formulated for the control of the infectious diseases, and also to provide a meat-inspection service, which, up to date, is conducted only by the various municipalities. He fully realizes that he has a great task on hand, but with the full support of the veterinary profession and his personal influence and with his constant efforts in that direction he can not help but succeed. Dr. Crespo as Chief of the Bureau of Animal Industry is ably assisted by Drs. C. A. Arias, Angel Iduate, Andros Henriquez and Armando Pascual.

The military veterinary service attained recognition in Cuba for which we have striven in the United States for many years. It represents an independent corps consisting of 26 veterinary officers. Two of these are majors, 9 captains, 9 first lieutenants and 6 second lieutenants. The writer had the opportunity of visiting Camp Columbia, one of the largest military camps in Cuba. On this occasion he observed the splendid and thorough organization of the veterinary service with well-equipped veterinary hospitals, school for farriers and the well-equipped laboratory. Major Luis A. Beltran is commanding the veterinary organization at the camp and is ably assisted by Captains J. M. Sanchez Mouso, Rafael Santamaria, Serafin Santamaria, Antonio M. Martinez and A. Fernandez Malberti. Captain Reinaldo Marquez is in charge of the laboratory, where, aside from routine diagnostic work, they prepare mallein, tetanus antitoxin, typhoid vaccines, etc., both for the use of the animals in the Army and for human use. It is indeed gratifying to know that the veterinary laboratory of the Army service has impressed the military authorities with its abilities, having been given charge of the preparation of the biological products in use for the men of the Army.

Dr. Jesus Vega is stationed at the War Department, ably representing there the military veterinary service. Dr. Vega is also one of the crack polo players of Cuba. He has repeatedly visited the United States with the Army polo team of Cuba, having had the honor of acting as captain of the team.

In the instruction of the cadets the future officers of the Cuban Army Veterinary Service have also been given due recognition. Captain J. M. Sanchez Mouso has charge of the instruc-

tion of the cadets in military hippology and other subjects pertaining to soundness and horsemanship.

The veterinary service in Cuba, being of recent development, has not as yet attained the standing it should occupy. This is no doubt due to the fact that little attention has been paid to the livestock industry of Cuba. While the country is primarily agricultural, all efforts have been concentrated on the development of sugar-cane and tobacco growing. They now, however, realize the disadvantages of concentrating upon one or two products, and there are good indications of efforts to diversify the agricultural interests. The natural resources of Cuba are splendidly adapted for livestock industry and there is no reason why that country should not develop into a producer of high grade livestock.

INFECTIOUS ANIMAL DISEASES

The infectious diseases of livestock in Cuba are very much the same as those occurring in the Southern States of our country, with the exception that tuberculosis is of rare occurrence and that infectious abortion is practically unknown. Most cases of tuberculosis which were found occurred in animals imported from the United States, and the veterinarians of Cuba are at a loss to explain why shipments of cattle from the United States, accompanied by certificates of having passed the tuberculin test, should, on tests there, prove tuberculous. Such occurrences, which are no different from those which have been repeatedly observed to occur in interstate shipments of certified cattle in this country, will have a tendency to bring into disrepute the value of the tuberculin test certificate and have a harmful effect upon the export trade of our livestock to Cuba, which in time, no doubt, could be developed into an important export trade.

Hog cholera is very widely distributed over the entire island, and the veterinarians in Cuba have very much the same problems on hog diseases as we have in the United States. The consensus of opinion, however, prevails there that the principal disease is the virus cholera, and that the control of this will eliminate the greatest source of danger to hog raising.

A. V. M. A. DELEGATE HONORED

In a special session the writer was honored by being elected an honorary member of the Cuban National Veterinary Associa-

tion, which is especially cherished, as this is the first instance in which a foreigner has been granted this honor. A special meeting of the Veterinary Association was called for December 18, at the council room of the University, where, aside from the members of the association, there were present the Rector of the University, the Dean of the Medical College, the President and



Group of Representatives of the Veterinary and Medical Professions of Cuba on the occasion of electing Dr. A. Eichhorn an honorary member of the National Cuban Veterinary Association. (Dr. and Mrs. Eichhorn seated.)



Group at special meeting in which Dr. A. Eichhorn was elected honorary member of the Cuban National Veterinary Medical Association. From left to right, Dr. Angel Iduate, Secretary of the Cuban National Veterinary Medical Association; Dr. Diego Tamiayo, Dean of the Medical Faculty; Dr. A. Eichhorn, delegate of the American Veterinary Medical Association; Dr. Carlos de la Torre, Rector of the National University of Cuba; Dr. Jose A. Presno, President of the Fifth Medical Congress of Cuba; Mrs. A. Eichhorn; Dr. Cosío, delegate from Mexico; Dr. Francisco M. Fernandez, Secretary General of the Congress

the Secretary General of the Congress, the delegates of the foreign countries, and several members of the faculty of the University. At this special meeting the following resolutions were presented by the Executive Committee of the Veterinary Medical Association:

WHEREAS, Our Association in extraordinary general session held on the evening of November 10, decided to invite a member of the American Veterinary Medical Association to act as delegate to the Fifth National Medical Congress;

WHEREAS, That institution appointed Dr. Adolph Eichhorn, illustrious and prominent member of same, who for several years has been regarded as an eminent man in the field of research and veterinary science and enjoys a high reputation in the United States and abroad;

WHEREAS, Our Association appointed said Dr. Eichhorn its honorary guest, and as such and as honorary guest of the Fifth Medical Congress he has attended its sessions and very specially those of the Eighth Section of Veterinary Medicine, taking active and important part in its deliberations;

WHEREAS, Dr. Adolph Eichhorn has all the qualifications required in the Article II of the Rules and Regulations of the National Veterinary Association for the election of honorary member;

The members of the Board of Directors undersigned purpose to the General Board taking the following actions:

1. Elect Dr. Adolph Eichhorn honorary member of the Association.
2. Grant him a diploma as such.
3. That the appointment and delivery of diploma take place during extraordinary general session specially called for.

Following the adoption of the resolutions Dr. Bernardo J. Crespo, President of the Association, delivered the following address:

The presence among us of Dr. Adolph Eichhorn, eminent North American pathologist, has been a very great pleasure for the Cuban veterinarians and an honor for the National Veterinary Association of Cuba, of which I have the honor to be President.

Dr. Eichhorn, as we all know, came to Cuba as the delegate of the American Veterinary Medical Association to attend the Fifth National Medical Congress, which terminated yesterday, on the acceptance by that association, to our great satisfaction and pleasure, of the invitation which we extended some weeks ago.

The purposes that inspired the motion adopted in the extraordinary general session celebrated by this body on the 10th of November ultimo, to request that the American Veterinary Medical Association honor us by sending a delegate to the Fifth Medical Congress to be celebrated in this city, were crowned with the greatest success on the designation of Dr. Eichhorn.

It having been our aspiration to initiate the establishment of a state of close relationship between the elements that constitute the great American Veterinary Association and that of Cuba, for the mutual benefit that may be derived, especially on our part, on account of the reduced number of associates and the short time we have been organized, it gives me great pleasure to be able to say that this aspiration has been fully satisfied by the cordial friendship

that has been formed between the two associations by the presence of Dr. Eichhorn, a friendship that the Cuban veterinarians will try to perpetuate for the greater success of our profession in Cuba.

As a legitimate manifestation of our friendship and appreciation of the personal merits of Dr. Eichhorn and the official character he represents among us as delegate of the American Veterinary Medical Association, as well as for his valuable collaboration in the work of the Veterinary Section of the Fifth Medical Congress, this institution conferred on him the distinction of guest of honor, and the Association takes pride in repeating these sentiments by means of this presidency in the solemn act we are now celebrating especially for the purpose of electing Dr. Eichhorn an honorary member of the National Veterinary Association of Cuba.

Permit me, Dr. Eichhorn, to request that on your return to the United States you will kindly extend to Dr. Kinsley, the President of the American Veterinary Medical Association, in my name and in that of the Cuban veterinarians, our sincere and affectionate salutation, telling him that in this little island, very close to the great North American republic, there exists an association that will endeavor in every manner to maintain an exchange of ideas and aspirations with the association which he represents, in order to make more effective the cordiality that we hope to maintain between the two associations, to our great satisfaction and benefit.

The National Veterinary Association of Cuba will feel very well satisfied if during the short time that Dr. Eichhorn and his distinguished wife have been among us they have been agreeably impressed, and on return to their country will have pleasant memories of their visit to Cuba, and at the same time, in my own name and in that of the Association, I wish to express the most sincere wishes for a pleasant return voyage to the United States.

Likewise Dr. Carlos de la Terre, Rector of the University, and Dr. Diego Tamayo, Dean of the Medical Faculty, also made very fitting remarks on the occasion.

The writer expressed profusely his profound thanks for the honor conferred upon him, especially emphasizing the fact that he considered this splendid recognition not particularly for his own self, but more as an honor to the Association that he represented. He also expressed the hope that the occasion would initiate closer relations between the members of the veterinary profession of the United States and those of Cuba.

The ceremonies were concluded with a buffet luncheon, as, in fact, was the case with many of the delightful affairs arranged for the guests and delegates from foreign countries.

In conclusion I can not refrain from expressing my deepest gratitude to all the Cuban confrères who made our sojourn in Cuba one of the most delightful incidents of our lives. From the time of our arrival at Havana until our departure they proved untiring in their profuse hospitality. On our departure from

our short but busy stay in Cuba we feel that we left behind many dear friends whom we hope to meet again.

I hope that the American Veterinary Medical Association will foster the pleasant relationship initiated by the Cuban National Veterinary Association and establish a closer intercourse between the veterinary profession of Cuba and that of the United States.

TALES OF BUGS

By FRANCES McMINDS

THE halls of state are now resounding with thrilling tales of bugs abounding; of germs above, below, surrounding, that must be vanquished "quick." Once more with its bovine afflatus, inspiring statesmen to berate us, comes "margaropus annulatus," known commonly as the "tick."

"The present law is too elastic; no good can come of one so plastic"; they say, "it should be made more drastic if we would make it stick. Our quarantine must be more rigid; so strict that none will dare to bridge it; we'll make all malefactors fidget who would protect that tick. 'Tis true, we have lime sulphuration, a strong commercialized hydration, sulphide arsenic preparation, in which the bug to flick; but just suppose the disinfection should meet the insect's deep objection, and he should thus escape detection, as might some slippery tick. We'll supplement our Texas barriers against all annulatus carriers; we'll be their omnipresent harriers, from plutocrat to 'hick.' We'll take each insect by the gullet; we'll find its stinger and we'll pull it; we'll mould a medicated bullet, but what we'll get that tick."

And so they talk of antiseptic, while statesmen grow more apoplectic, with collars moist and faces hectic, as if they'd shy a brick at any who in moderation would counsel less appropriation than in their own wise estimation would serve to squelch the tick. But still the species annulatus, unconscious of this dire hiatus, is sharpening its apparatus for subcutaneous prick; for pyrotechnics but amuse it, though rhetoricians may abuse it; it grins the while the State pursues it—that legislative "tick."—
From Houston Post Special.

CLINICAL AND CASE REPORTS

(Practitioners and others are invited to contribute to this department reports of unusual and interesting cases which may be helpful to others in the profession.)

SWINE ERYSIPELAS ¹

By J. C. QUINLAN
San Francisco, California

RECENTLY I had an outbreak of a peculiar disease on a hog ranch containing about 1,000 hogs close to San Francisco. These hogs had all been vaccinated against hog cholera by me. The disease at first was a puzzle to me, so I called in several veterinarians in consultation, some having the reputation of experts on hog diseases. The latter called it cholera, others called it swine-plague. I, however, was not satisfied with either of the diagnoses, and after considerable study, reading, and several post-mortem examinations, I came to the conclusion that I had swine erysipelas or red fever of swine (Law's Veterinary Medicine, Vol. IV).

The disease in many respects resembles cholera or swine plague. However, you have not the dark bloody diarrhea, with the terrible odor from it, as in cholera, but you have a yellow diarrhea with no odor. You get red to purplish blotches on the belly and sternum, at the roots of the ears and at the point of the snout. Many of the hogs pass blood through the nose, have hunched backs, staggering gait, and always want to crawl under the litter. Some have temperatures as high as 109° F., while others, 24 hours before death, show subnormal temperatures of 96° F. Fat pigs lose control of the hind legs entirely, drinking plenty of water but with little or no appetite. Many of them show no red blotches on the belly or sternum, but on the side of the neck.

Post-mortem shows the blood very dark and thick; liver enlarged and very dark; spleen enlarged and very dark, almost pimply on the surface; lungs in most cases are engorged with dark blood, showing double pneumonia in advanced stages. A small portion of the lung in a few cases would still have its normal color. All of the glands are very dark brown, although a few of them are light red in the center of the gland, but dark on the outside. Inside of the stomach are patches of dark red, and the same are noted in the intestines. Very few of the kidneys

¹Other articles on swine erysipelas will be found on pages 133 and 139 of the May, 1921, issue of the JOURNAL.

show any petechial spots, and then only several such points.

What made me investigate this outbreak was the absence of those lesions which I usually get in cholera, such as bright red blood, with petechiated bladder, kidneys, intestines, ileo-cecal valve, lungs and epiglottis, also the dark bloody diarrhea, with its specific odor which you never forget.

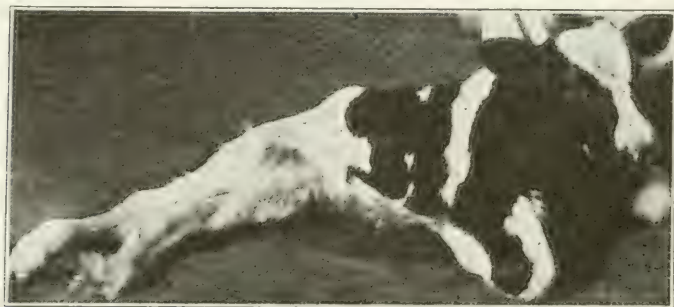
I took samples of the urine and a spleen to two different laboratories, one of the Letterman General Hospital at Presidio, and they both found the bacillus of rouget plentiful in the urine. At the Letterman Hospital they injected white mice with the bacillus, which proved fatal in less than 24 hours, and they then found the bacillus plentiful in the heart's blood of the mouse.

CONGENITAL ANKYLOSIS IN A CALF

By THOMAS B. CARTER

Portland, Oregon

I WAS CALLED to see a cow that was straining as if in labor trying to give birth to a calf. On examination I found a breech presentation with the hind legs extending forward along the calf's abdomen. When an effort was made to flex the hind legs, it was found that they were stiff and would not flex in any of the joints. By repelling the rump forward with my arm and



Congenital ankylosis in hind legs of calf

giving traction on the legs with a chain around the fetlocks, I was able to turn the feet back and deliver the calf. This is easier said than done, as it took the better part of an hour.

The calf was quite normal from the sacrum forward, but from the sacro-lumbar articulation back there was no movement in any joint except those of the fetlocks and digits. The hocks, stifle and hip joints were ankylosed solid.

ABSTRACTS

CLINICAL STUDIES OF THE ACTION AND USE OF SUPRARENIN IN THE HORSE. Dr. Habersang. Monatshefte f. prakt. Tierheilkunde, vol. 32 (1921), p. 127.

The maximal therapeutic dose of suprarenin hydrochloricum (adrenalin) for the horse is subcutaneously 0.00002 to 0.00004 gram per kilo (9 to 18 c.c. of the 1:1000 sol. for 1000 lb. horse); intravenously, 0.00001 gram per kilo. The primary effect is arterial constriction and blood pressure rise; secondarily and especially with excessive doses, the reverse takes place. Rise in blood pressure puts a load on the heart which is directly stimulated to perform more work, but no additional strength is given the heart. Adrenalin is indicated for local anemia also after internal hemorrhage and collapse following excessive hemorrhage. It is contraindicated in (a) all heart abnormalities or diseases, (b) all lung conditions that might be adversely affected by increased blood circulation, (c) in all diseases accompanied by high blood pressure, (d) in infectious diseases that have weakened the heart and circulatory system. The danger of secondary collapse must be guarded against. Suprarenin is the best diaphoretic for the horse when intravenously injected. Local necrosis is to be guarded against in subcutaneous injection.

W. N. BERG.

PROPERTIES AND EFFECTS OF OESTRIN AND ITS RELATION TO PERNICIOUS ANEMIA OF HORSES. R. Seyderhelm. Archiv fur Exper. Pathologie u. Pharmacol., vol. 82 (1918), pp. 253-326.

Toxic substances were obtained by extracting gastrophilus larvae with various solvents and fractionating the solutions by chemical methods. The effects of the various fractions were tested on horses and laboratory animals. Among the substances obtained, two are of special importance; (1) a lipid substance which hemolyzes red cells in vitro but which is not related to the anemia, and (2) oestrin, a poisonous substance which is not hemolytic in vitro, but causes typical anemia when injected into rabbits and horses in sub-lethal doses. The claims made by

French investigators (Carré and Vallée) that the anemia is infectious and due to a filtrable virus, is disputed. Oestrin is a poison resembling snake venom in its action.

W. N. BERG.

GENERAL ANESTHESIA IN THE HORSE BY INTRAVENOUS INJECTION OF CHLORAL HYDRATE. M. Moussaron. *Rev. Vétérinaire*, vol. 73 (1921), no. 9, p. 538.

A solution of 50 grams of chloral hydrate in a liter of boiled water was injected into the jugular vein. The apparatus used consisted of a fine bleeding trocar, attached to one end of a rubber tube 60 to 80 cm. long, with a glass funnel fitted to the other end of the tube. The solution was warmed to 37° C. before introducing into the vein. About a minute or two after the injection and sometimes even before completing the injection, the animal is taken with sudden symptoms simulating drunkenness; it staggers and soon falls to the ground. There is profound insensibility and surgical operations or cautery can be undertaken without further means of restraint.

This method gives quick results, requires the aid of no assistants, and is safe. The dose used by the author is 50 grams chloral hydrate in 1 liter of water for a horse weighing from 450 to 500 kg. (990-1,100 lbs.). The duration of anesthesia is about one and a half hours.

L. T. GILTNER.

TRANSMISSION OF PARATUBERCULOSIS (JOHNE'S DISEASE) TO EXPERIMENTAL ANIMALS. C. W. Andersen. *Arch. Wiss. u. Prakt. Tierheilk.*, vol. 47 (1921), no. 1, p. 77.

The artificial transmission of Johne's disease to calves, sheep and goats is easily accomplished, but aside from a single instance reported by Twort, small laboratory animals (rabbits) have not been infected. Andersen reports that in a series of experiments in which 22 rabbits were used, some of which were injected subcutaneously, others intravenously, and still others fed emulsions of intestines and mesenteric lymph glands of cattle affected with Johne's disease, and also pure cultures, he was able to reproduce the disease in six cases. The autopsy findings were almost identical to those found in cattle, viz.,

small intestines much thickened and verrucose; mesenteric glands swollen. Both the intestine and glands contained many bacilli. None of the other organs showed pathologic changes or harbored organisms. The affected rabbits remained in good flesh and showed no diarrheal symptoms at any time. Pure cultures were obtained from the mesenteric glands of the rabbits.

In a supplementary note the author states that he has succeeded in cultivating Johne's bacilli on ordinary glycerine bouillon. The surface of the medium was covered with a thick, wrinkled membrane. Paratuberculin prepared from such cultures was tested (0.5 gm. subcutaneously) on a herd of 25 cattle in which there had been some losses from Johne's disease. Three reactors were obtained. Forty-eight other cows were injected intracutaneously; on one side with paratuberculin and on the other with avian tuberculin. Of these 28 reacted to the paratuberculin, and only 16 to the avian tuberculin.

L. T. GILTNER.

CONTRIBUTION TO THE KNOWLEDGE CONCERNING THE DIAGNOSIS OF BIPOLAR INFECTION IN ANIMALS. W. Pfeiler and A. Kohlstock. *Zeitschr. f. Infekth. etc. der Haustiere*, vol. 21 (1921), no. 4, p. 276.

The results of the author's experiment show that the intraperitoneal inoculation of laboratory animals is decidedly superior to the subcutaneous method for demonstrating bipolar infections. The rabbit is more susceptible to the infection than the guinea-pig. Mice are not as safe animals to use for diagnosing the disease as the other experimental animals. Mice are highly susceptible to decomposition bacteria and streptococci, which kill them within a short time. In some cases mice die a long time after being inoculated without showing the specific bacteria in their tissues, while guinea-pigs and rabbits inoculated at the same time die of the infection.

If the tissues sent to the laboratory are fresh and contain numerous bacteria which are also highly virulent, the subcutaneous injection of the inner part of the ear of the rabbit is successful, but in other kinds of specimens this method is not so certain. Rabbits are resistant to decomposition bacteria, and such organisms develop less readily in the peritoneal fluid than

in the subcutaneous tissues. Finally the resorption from the peritoneal cavity of any bipolar bacilli that may be present is so quick that any tendency on the part of the decomposition organisms to outgrow the bipolar bacilli is not to be feared. Guinea-pigs are relatively more susceptible to decomposition and other septic organisms than the rabbit.

L. T. GILTNER.

THE MEAT OF HEALTHY ANIMALS IS FREE FROM BACTERIA. E. Bruge and W. Kiessig. *Allatorvosilapok*, 1921, page 95.

The authors conclude from their investigation that the muscle of healthy animals is contaminated by various bacteria, not as a consequence of distribution of bacteria from the alimentary canal during lifetime, as Condrady describes, but from other causes. Special consideration should be given to the incisions made on the animals at the time of slaughter. Through these openings the butchers remove blood clots, etc., with their unsterile hands or fingers. The contamination is furthered by the cutting of the esophagus. In the jugular vein and in the anterior vena cava negative blood pressure exists. Contaminated material around these open blood vessels, from the butchers' hands or from the severed esophagus, will be drawn into the right auricle of the heart, from there into the right ventricle; thence into the lungs; from there back to the left side of the heart. Then the blood will be forced into the aorta, and into the tissues of the entire animals. Blood samples taken from healthy animals at the time of slaughter were found to be sterile. But blood and muscle samples taken from the same animals at various intervals after slaughter showed various degrees of contamination with various kinds of bacteria. According to the authors, the contamination of the meat of healthy animals occurs at the time of slaughter. This conception is supported also by the finding of various kinds of bacteria in the slaughtered animals' organs. In judging contaminated meat, aside from post-mortem contamination (such as insanitary handling of meat), the contamination of the meat at the time of slaughter should receive more consideration.

M. BORSOS.

ASSOCIATION NEWS

AMERICAN VETERINARY MEDICAL ASSOCIATION

*Proceedings of Fifty-eighth Annual Meeting, Denver, Colo.,
September 5 to 9, 1921*

(Continued from the February JOURNAL)

REPORT OF THE EDITOR OF THE JOURNAL TO THE EXECUTIVE BOARD

THE JOURNAL OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION for the year from October, 1920, to September, 1921, volumes 11 and 12, new series, has contained an average of 130 pages of reading matter, an increase of 10 pages over the average for the preceding period. Its contents have included the proceedings of the fifty-seventh annual meeting of the Association, 125 original papers, 37 clinical and case reports, 66 abstracts of research papers (practically all foreign), 8 book reviews, 92 reports and notices of meetings of veterinary associations and other gatherings, 42 editorials, and numerous miscellaneous articles and items.

A gratifying increase is apparent in the number of clinical and case reports and in other material of a practical nature. Members of the profession are responding better than formerly to our requests for papers of this character. The co-operation of our Resident State Secretaries and of secretaries of State and local associations in sending in reports and papers is appreciated and a continuation is solicited. Along with research papers of good quality and papers dealing with education and public service it is our desire to publish a good proportion of practical articles suited to the needs of the most numerous class of our membership, the practitioners. With the co-operation of all concerned, and especially of the practitioners themselves in reporting interesting and helpful cases, we can make the JOURNAL of still greater value to the profession.

I remember that the *New York Medical Journal* used to publish brief prize essays on subjects previously announced. These seemed to me to be exceedingly practical and valuable to medical

practitioners. The plan, as I recall it, was to announce a subject, some disease or ailment of general interest, and invite brief articles (not exceeding, say, 500 words), to be submitted by a certain date, with cash prizes to the best three. The prize-winning articles were then published. The object was to set forth effective *methods of treatment*, not to describe diseases.

It seems to me that this plan, which is submitted for your consideration, might be very good for the JOURNAL, to arouse interest among practitioners, help them in dealing with difficult cases and to improve their methods, and bring in a supply of material of a class different from the longer papers. Subjects should be announced at least three months ahead, and the Sub-Committee on Journal should award the prizes of, say, \$15, \$10 and \$5.

A notable increase has also been made in the abstracts of foreign literature. By this means our readers have been given the results of the important research work done abroad and have thus been enabled to keep abreast of developments in the field of veterinary science throughout the world. Our acknowledgments and thanks are tendered to our collaborators who have assisted in translating and abstracting this material. In this connection I desire to call attention to the increasing number of our original articles which have been published in their entirety or abstracted by many foreign periodicals.

The advancement and development of the veterinary profession and the further elevation of standards of education have been kept constantly in mind. Among the admirable papers aimed in this direction was a notable one entitled "Our Profession," by President White.

Notwithstanding an increase in our advertising rates, the patronage of our advertisers has been well maintained in the face of adverse business conditions. Our advertisers evidently appreciate the advantages of our official organ as a medium for placing their announcements before a large and select body of veterinarians.

Likewise our subscribers have increased in number, notwithstanding that the price for the JOURNAL was raised 33 1/3 per cent, or from \$3 to \$4 per annum.

Though comparisons are said to be odious, the following may be of interest in reference to the relative income from the above sources: In 1919 the advertisers paid \$4,832.53 and the sub-

scribers \$1,297.46; total, \$6,129.99. In 1920 the advertisers paid \$5,641.91 and the subscribers \$1,806.50; total \$7,448.41. The above-mentioned years are comparable because the rates for advertisements and subscriptions were the same. In 1921, with the increase effective, we have collected in eight months \$4,183.42 for advertisements and \$1,643.56 for subscriptions, which on a yearly basis would be \$6,275.13 for advertisements and \$2,465.34 for subscriptions, or a total of \$8,740.47.

Dr. Jacob informs me that he has received this year from Secretary Mayo and myself for the JOURNAL account \$21,372.15, as against \$12,477.30 last year. In addition, mention should be made of the fact that four of our debtors went into the hands of receivers, but our losses were less than \$100 in all. Furthermore, we hold \$900 of bills receivable in the form of notes which become due during October and November.

During the year further improvement was made in the typographical appearance of the JOURNAL and in the quality of paper used. We have also been able to obtain better service in the prompt printing and mailing of the monthly editions, as well as a 10 per cent reduction in the cost of publication. The detailed information concerning this latter subject has been furnished to Dr. J. A. Kiernan, of the Sub-Committee on Journal, at his request.

All my records, bank book, check book, letter files, duplicate deposit slips, monthly statements from the bank, quarterly statements to the Executive Board, etc., were turned over to a qualified accountant for review, and his certificate of examination and audit is attached for your information.

Respectfully submitted.

J. R. MOHLER, *Editor*.

REPORT OF THE TREASURER

FROM AUGUST 4, 1920, TO AUGUST 4, 1921, INCLUSIVE

RECEIPTS

1920	
Aug. 25. From Dr. N. S. Mayo, A. V. M. A. and Journal Fund	\$952.24
Sept. 11. From Dr. N. S. Mayo, A. V. M. A. and Journal Fund	6,638.95
Oct. 16. From Dr. N. S. Mayo, A. V. M. A. and Journal Fund	4,302.83
" 19. Interest on bonds, Journal Fund	229.41
" 19. Interest on bonds, A. V. M. A.	229.41

1920

Nov. 19.	From Dr. N. S. Mayo, A. V. M. A. and Journal Fund	\$1,048.38
Dec. 11.	Interest on bonds, Journal Fund.....	20.00
" 11.	Interest on bonds, A. V. M. A.	20.00
" 11.	From Dr. J. R. Mohler, Journal Fund.....	2,027.10
" 20.	From Dr. N. S. Mayo, A. V. M. A. and Journal Fund	388.11

1921

Jan. 22.	From Dr. N. S. Mayo, A. V. M. A. and Journal Fund	2,395.43
Feb. 18.	From Dr. N. S. Mayo, A. V. M. A. and Journal Fund	1,602.13
" 21.	Interest on U. S. bonds, Journal Fund.....	93.50
" 21.	Interest on U. S. bonds, A. V. M. A.	96.25
" 21.	Interest on certificate of deposit, Relief Fund.....	80.00
Mch. 18.	From Dr. J. R. Mohler, Journal Fund.....	2,771.92
" 18.	From Dr. N. S. Mayo, A. V. M. A. and Journal Fund	473.54
Apr. 22.	From Dr. N. S. Mayo, A. V. M. A. and Journal Fund	1,040.20
May 20.	From Dr. N. S. Mayo, A. V. M. A. and Journal Fund	855.50
June 16.	From Dr. N. S. Mayo, A. V. M. A. and Journal Fund	355.05
" 17.	From Dr. J. R. Mohler, Journal Fund.....	2,251.42
July 19.	From Dr. N. S. Mayo, A. V. M. A., Journal and Relief Funds	718.88
" 30.	From Dr. J. R. Mohler, Journal Fund.....	1,616.55
Aug. 4.	Interest on bonds, Journal Fund.....	239.96
" 4.	Interest on bonds, A. V. M. A.	239.97

\$30,719.73

EXPENDITURES

ASSOCIATION FUND

Aug. 9.	Dr. H. D. Bergman, expenses Committee on Intelligence and Education.....	\$178.25
" 9.	S. B. Newman & Co., letter files.....	1.30
" 9.	Commercial Stationery & Loose Leaf Co., supplies	25.39
" 9.	Dr. N. S. Mayo, salary for July, 1920.....	100.00
" 9.	Dr. N. S. Mayo, office expenses for July, 1920.....	73.20
" 9.	The Ravenswood Press, printing.....	62.35
" 9.	The Evanston Letter Service, multigraphing.....	19.92
" 9.	The Ravenswood Press, printing.....	6.25
Sept. 11.	Dr. W. G. Chrisman, expenses resident secretary for Virginia	5.00
" 11.	G. H. Smith, services preparing report.....	16.75
" 11.	Kenfield-Leach Co., printing Columbus meeting program	162.00
" 11.	Dr. W. A. Hilliard, expenses resident secretary for Manitoba	6.85
" 11.	Dr. R. P. Marsteller, expenses resident secretary for Texas	5.00
" 11.	Dr. H. D. Bergman, hotel expenses at Columbus account meeting Committee on Intelligence and Education	12.00

1920

Sep. 11.	Dr. M. H. Reynolds, expenses Com. on Tuberculosis	5.95
" 11.	Dr. L. E. Day, expenses Com. on Int. and Education	43.56
" 11.	Dr. C. A. Cary, expenses of President's office.....	22.62
" 11.	Horse Association of America, for ten shares of stock	50.00
" 11.	Dr. N. S. Mayo, expenses of Secretary's office for August	246.05
" 11.	The Ravenswood Press, envelopes.....	17.25
" 11.	Dr. N. S. Mayo, salary for August.....	100.00
" 11.	Dr. R. V. Kennon, refund acct. application not accepted	10.00
" 11.	Dr. J. G. Slade, refund acct. application not accepted	8.75
" 11.	Dr. J. R. Scully, refund acct. application not accepted	10.00
" 11.	Dr. W. H. Lynch, refund acct. application not accepted	10.00
" 11.	Dr. I. A. Anderson, refund acct. application not accepted	8.00
" 11.	Dr. R. P. Marsteller, expenses resident secretary for Texas	5.00
" 11.	Dr. J. H. Bias, refund acct. application not accepted	10.00
" 11.	Dr. C. W. Cranford, refund acct. application not accepted	10.00
" 11.	Dr. W. G. Saunders, refund acct. application not accepted	10.00
" 11.	Dr. N. R. Yarborough, refund acct. application not accepted	10.00
" 11.	Dr. J. F. Brown, refund acct. application not accepted	10.00
" 11.	Dr. J. F. Kagey, refund acct. application not accepted	10.00
" 11.	Dr. W. B. Casilear, refund acct. application not accepted	10.00
" 11.	Dr. W. H. Hoskins, expenses to Omaha account Salmon Memorial Fund, and office expenses for June and July	89.27
" 11.	Dr. G. W. Gillis, expenses resident sec. for Ind.....	10.02
" 11.	Dr. W. H. Welch, expenses resident sec. for Ill.....	52.21
" 11.	N. S. Mayo, expenses self and assistant attending meeting at Columbus	150.30
" 11.	Dr. Tait Butler, expenses Com. on Int. and Education	95.80
" 11.	Dr. F. A. Lambert, expenses resident sec. for Ohio	16.85
" 11.	Dr. Hadleigh Marsh, expenses resident sec. for Montana	6.70
" 11.	Dr. C. P. Fitch, printing for Com. on Abortion.....	11.50
" 11.	Dr. F. M. Cahill, expenses resident sec. for Mo.	22.14
" 13.	Prof. H. Vallée, contribution to Belgian Relief Fund	500.00
" 25.	Dr. C. A. Cary, expenses attending Columbus meeting	107.13
" 25.	S. B. Newman & Co., printing annual report.....	47.50
" 25.	Dr. Frank Edwards, refund of 1920 dues.....	5.00

1920

Sep.	25.	Dr. M. Jacob, expenses attending Columbus meeting	\$ 40.96
"	25.	H. P. Hoskins, expenses account Section on Sanitary Science and Police	10.20
"	25.	Capt. H. S. Williams, refund on duplicate application	10.00
"	25.	Wm. F. Lipps, premium on bond of Secretary A. V. M. A.	12.50
"	25.	Dr. A. T. Peters, refund of 1920 dues	5.00
Oct.	15.	The Ravenswood Press, envelopes and postal cards	60.75
"	15.	The Ravenswood Press, letter heads	26 50
"	15.	Dr. N. S. Mayo, office expenses	114.85
"	15.	Dr. Cassius Way, expenses Com. on Ind. and Education	101.52
"	15.	Master Reporting Co., reporting Columbus meeting	372.73
"	15.	Dr. W. Horace Hoskins, expenses Com. on Legislation	23.01
"	20.	Dr. N. S. Mayo, salary for September	166.66
Nov.	1.	E. J. Powers, letter heads and envelopes	17.75
"	1.	Champlin Printing Co., printing for Pres. White	12.00
"	1.	Workman Mfg. Co., printing ledger sheets	17.50
"	1.	Master Reporting Co., extra copies report Columbus meeting	109.80
"	1.	Dr. H. D. Bergman, stationery for Committee on Intelligence and Education	14.75
"	1.	The Ravenswood Press, printing membership cards	36.25
"	13.	Dr. N. S. Mayo, salary for October	166.66
"	13.	Dr. N. S. Mayo, office expenses	74.10
"	13.	Dr. C. S. Rockwell, expenses resident sec. for Pa.	4.56
"	20.	The Ravenswood Press, printing cards	14.50
Dec.	4.	Shepard, Toms & Co., premium on bond of Treas.	35.00
"	4.	Dr. D. S. White, expenses attending assn. meeting in Tennessee	56.86
"	4.	Honaker, Florist, floral wreath for Dr. Musselman	15.35
"	4.	Dr. N. S. Mayo, expenses of office for November	48.23
"	4.	Dr. N. S. Mayo, salary for November	166.66
"	11.	Dr. D. S. White, expenses attending meetings	58.69
"	11.	Bowman Pub. Co., printing constitution and by-laws	560.00
"	16.	City National Bank, Knoxville, certificate of deposit	3,000.00
"	24.	Dr. Ward Giltner, expenses Com. on Abortion	23.62
"	24.	Dr. C. P. Fitch, expenses Com. on Abortion	60.00
"	24.	Dr. J. F. DeVine, expenses Com. on Abortion	123.15
"	24.	Dr. H. D. Bergman, expenses Committee on Int. and Education	49.00

1921

Jan.	10.	Dr. N. S. Mayo, salary for December	166.66
"	10.	Dr. N. S. Mayo, office expenses	231.43
"	10.	Dr. J. N. Frost, expenses shipping A. V. M. A. library	10.00
"	10.	The Ravenswood Press, printing	231.50
"	29.	Dr. Cassius Way, expenses Committee on Int. and Education	125.74
"	29.	G. H. Smith, stenographic services to Dr. Jacob	1.00

1921

Feb.	5.	Horse Association of America, annual dues.....	\$ 50.00
"	5.	Dr. D. S. White, expenses attending meeting in Wisconsin	51.47
"	5.	The Ravenswood Press, printing.....	53.00
"	5.	Dr. N. S. Mayo, salary for January.....	166.66
"	5.	Dr. N. S. Mayo, office expenses for January.....	123.31
"	14.	Dr. D. S. White, expenses attending meetings.....	99.23
"	19.	Dr. L. W. Goss, expenses Com. on Int. and Education	49.78
"	19.	Dr. D. S. White, expenses attending meeting in Michigan	31.96
Mch.	10.	Evanston Letter Service, multigraphing.....	10.22
"	10.	Dr. D. S. White, office expenses.....	13.89
"	10.	Dr. N. S. Mayo, office expenses for February.....	79.54
"	10.	Dr. N. S. Mayo, salary for February.....	166.66
"	26.	The Ravenswood Press, printing.....	92.61
Apr.	2.	Dr. N. S. Mayo, salary for March.....	166.66
"	2.	Dr. N. S. Mayo, office expenses for March.....	62.00
"	2.	The Ravenswood Press, envelopes.....	17.06
"	2.	Journal of the A. V. M. A., back numbers of Journal	35.00
"	2.	The Ravenswood Form Letter Shop, form letters.....	6.90
"	2.	Dr. L. Enos Day, expenses Com. on Int. and Education	76.88
"	15.	Dr. L. W. Goss, expenses Com. on Int. and Education	128.59
"	25.	Dr. H. D. Bergman, expenses investigating southern veterinary colleges	189.15
"	25.	Shepard-McManus Co., premium on bond of Treas.....	25.46
"	25.	The Dartnell Corporation, printing vouchers.....	7.75
"	25.	Dr. W. Horace Hoskins, floral wreath for Dr. Cochran	11.53
May	6.	The Campus Press, printing	8.25
"	6.	Dr. N. S. Mayo, office expenses for April.....	60.65
"	6.	Dr. N. S. Mayo, salary for April.....	166.66
"	20.	Champlin Printing Co., printing.....	9.00
June	3.	Marshall Jackson Co., blank book.....	4.25
"	3.	Federal Printing Co., envelopes.....	8.50
"	3.	Dr. N. S. Mayo, office expenses for May.....	70.05
"	3.	Dr. N. S. Mayo, salary for May.....	166.66
"	3.	Dr. S. E. Bennett, expenses account Executive Board business	40.70
"	28.	Dr. L. W. Goss, expenses Com. on Int. and Education	86.30
"	28.	Dr. Thos. E. Smith, expenses collecting Liautard American Veterinary Relief Fund.....	17.30
"	28.	Dr. M. Barker, expenses as resident sec. for Saskatchewan	3.00
"	28.	Artcraft Mfg. Co., buttons for Denver meeting.....	18.12
"	28.	Dr. D. S. White, office expenses for three months	17.11
"	28.	Dr. H. D. Bergman, expenses Com. on Int. and Education	39.25
July	12.	Dr. N. S. Mayo, salary for June.....	166.66
"	12.	Dr. N. S. Mayo, office expenses for June.....	35.92
"	25.	Dr. H. D. Bergman, expenses as resident sec. for Iowa	14.50

1921

July 25.	Dr. Cassius Way, expenses Com. on Int. and Education	\$ 66.87
" 30.	Dr. E. T. Harrington, expenses resident sec. for Massachusetts	10.00
" 30.	Dr. D. S. White, expenses attending meetings.....	119.10
Aug. 3.	Dr. N. S. Mayo, office expenses for July.....	50.45
" 3.	Dr. N. S. Mayo, salary for July.....	166.66
		<hr/>
		\$11,781.59

EXPENDITURES

JOURNAL FUND

1920

Aug. 20.	Andrew B. Graham Co., printing July edition of Journal	\$1,142.79
Sep. 11.	Andrew B. Graham Co., printing August edition of Journal	1,270.48
" 11.	Dr. J. R. Mohler, salary for June and July.....	350.00
" 11.	Marcus W. Kling, assisting in business management of Journal	45.00
" 11.	Gibson Bros., Inc., envelopes and printing.....	24.50
" 11.	James M. Pickens, assisting in editing Journal.....	45.00
" 25.	Gibson Bros., Inc., envelopes and printing.....	107.50
Oct. 15.	Andrew B. Graham Co., printing September edition of Journal	1,344.46
" 15.	Marcus W. Kling, assisting in business management of Journal	45.00
" 15.	Dr. J. R. Mohler, salary for August.....	175.00
" 15.	James M. Pickens, assisting in editing Journal.....	45.00
Nov. 1.	James M. Pickens, assisting in editing Journal.....	45.00
" 1.	Andrew B. Graham, printing Oct. edition of Journal	1,232.56
" 1.	Marcus W. Kling, assisting in business management of Journal	45.00
" 13.	Marcus W. Kling, assisting in business management of editing Journal	45.00
" 13.	Dr. J. R. Mohler, salary for Sept. and Oct.....	500.00
" 20.	Andrew B. Graham Co., printing November edition of Journal	1,214.11
" 20.	Gibson Bros., Inc., envelopes and printing.....	21.00
Dec. 4.	James M. Pickens, assisting in editing Journal.....	45.00
" 11.	Gibson Bros., Inc., envelopes and printing.....	49.00
" 11.	Addressograph Co., purchase price of addressograph	222.75
" 24.	Andrew B. Graham Co., printing December edition of Journal	1,179.03

1921

Jan. 10.	James M. Pickens, assisting in editing Journal.....	45.00
" 10.	Marcus W. Kling, assisting in business management of Journal	45.00
" 10.	Gibson Bros., Inc., envelopes and printing.....	231.00
" 10.	Dr. J. R. Mohler, salary for Nov. and Dec.....	500.00
" 10.	Marcus W. Kling, assisting in business management of Journal	45.00
" 29.	James M. Pickens, assisting in editing Journal.....	45.00
" 29.	Andrew B. Graham Co., printing January edition of Journal	1,323.03

RECAPITULATION

Bank balances at beginning of period.....	\$5,560.29
Plus amount on time deposit (Relief Fund).....	2,000.00
	<hr/>
	\$7,560.29
Less checks cashed during period which were issued and included in previous report.....	182.07
	<hr/>
	\$7,378.22
Receipts during period covered by this report.....	30,719.73
	<hr/>
	\$38,097.95
Less expenditures during period.....	32,741.37
	<hr/>
	\$5,356.58
Plus amount placed on time deposit of A. V. M. A. funds and included in expenditures above.....	3,000.00
	<hr/>
Total cash on hand	\$8,356.58
Total bonds on hand	18,984.78
	<hr/>
Grand total	\$27,341.36

ASSOCIATION FUND

Bank balance at beginning.....	\$ 3,173.19
Less old checks cashed	182.07
	<hr/>
	\$ 2,991.12
Receipts during period	8,828.90
	<hr/>
Total	\$11,820.02
Expenditures during period	11,781.59
	<hr/>
Balance	\$ 38.43
Bank balance	\$405.99
Less outstanding checks	367.56
	<hr/>
	\$ 38.43
Plus amount on time deposit.....	\$ 3,000.00
	<hr/>
	\$ 3,038.43

JOURNAL FUND

Bank balance at beginning	\$ 1,693.62
Receipts during period	21,372.15
	<hr/>
Total	\$23,065.77
Expenditures during period	20,459.78
	<hr/>
Balance	\$ 2,605.99
Bank balance	\$2,605.99

RELIEF FUND

Bank balance at beginning	\$ 693.48
Receipts during period	518.68
	<hr/>
Total	\$ 1,212.16
Expenditures during period	500.00
	<hr/>
Balance	\$ 712.16

Bank balance	\$712.16	
Plus amount on time deposit	\$ 2,000.00	
Total on hand	\$ 2,712.16	
Balance to credit of A. V. M. A. Fund	\$ 38.43	
Plus amount on time deposit	3,000.00	
Plus amount of bonds on hand	9,515.00	
		\$12,553.43
Balance to credit of Journal Fund	\$ 2,605.99	
Plus amount of bonds on hand	9,469.78	
		12,075.77
Balance to credit of Relief Fund	\$ 712.16	
Plus amount on time deposit	2,000.00	
		2,712.16
Total balance cash and bonds on hand		\$27,341.36

BOND RECAPITULATION

Canada bonds, par \$3,000.00, purchase price	\$3,023.20	
Liberty bonds, par 7,000.00, purchase price	6,491.80	Assn.
		Fund
\$10,000.00	\$9,515.00	
Canada bonds, par \$7,000.00, purchase price	\$6,619.78	
Liberty bonds, par 3,000.00, purchase price	2,850.00	Journal
		Fund
\$10,000.00	\$9,469.78	

M. JACOB, *Treasurer.*

COLORADO VETERINARY MEDICAL ASSOCIATION

The nineteenth annual meeting of the Colorado Veterinary Medical Association was held at Denver on January 19, 1922.

The chief items of business were reception of the report of the Committee on the American Veterinary Medical Association; the decision to withhold further publication of proceedings for another year; the adoption of the idea of an animal anesthetic law in principle, as presented by the Blue Cross Society; the decision to hold a three-day summer session, and the decision to hold a two-day winter session in future.

The following were elected to membership: Charles L. Davis, Max C. Grandy, L. P. Leavitt, Harry S. Richards, Frank R. Smythe.

The election of officers resulted in the selection of the following: President, J. F. Meinzer; first vice-president, C. C. Stewart; second vice-president, W. G. Blake; secretary-treasurer, I.

E. Newsom. Executive Committee: M. J. Warner, William B. McGuire, A. G. Wadleigh.

Dr. G. W. Stiles presented a paper on farm sanitation, in which he called attention to considerable laxity in this respect. Dr. Stiles spoke particularly of the water and food supply, illustrating his paper from cases of his own experience and laboratory examinations made in connection with his work as pathologist for the Bureau of Animal Industry.

Dr. A. N. Carroll presented a paper in which he outlined a plan for the coordination and unification of all veterinary societies. He stated that a committee from the American Veterinary Medical Association was working on the same idea. Following the reading of the paper, the association adopted the plan in principle and appointed a committee for furthering the idea.

Dr. W. E. Howe reported on the tuberculosis conference at Chicago, and Dr. C. G. Lamb on the meeting of the United States Livestock Sanitary Association.

Dr. George H. Glover read a paper on posterior paralysis in swine, in which he brought out that the present knowledge indicated that the disease was due to a food deficiency, possibly being some vitamin. It was reported that Dr. B. F. Davis of Cheyenne, Wyoming, had excellent results in feeding carrots to affected animals.

Dr. R. F. Bourne read a paper on vitamins in which he went into considerable detail in outlining this new addition to our knowledge.

I. E. NEWSOM, *Secretary*.

MAINE VETERINARY MEDICAL ASSOCIATION

The annual meeting of Maine Veterinary Medical Association was held in Augusta, Me., on January 11. Election of officers resulted as follows: President, Dr. C. F. Davis; Vice President, Dr. E. E. Russell; Secretary and Treasurer, Dr. P. R. Baird. There was a good attendance and many interesting and profitable discussions took place. Hon. H. M. Tucker, Chief of State Department of Agriculture, gave an interesting talk on the activities of his department during the past year. Dr. A. L. Murch presented a paper on "Sterility." Dr. M. E. Maddocks read a paper on "Drugs from a Financial Angle." A commit-

tee was appointed to confer with the Blue Cross Society in drafting some form of anesthetic law for animal operations.

Resolutions were passed upon the death of Dr. W. L. West, of Belfast, whose sudden and untimely end was a shock to his brother practitioners, as he seemed in the best of health.

Next meeting will be held in Portland, April 12, with a clinic in the afternoon and meeting in the evening.

P. R. BAIRD, *Secretary*.

CONNECTICUT VETERINARY MEDICAL ASSOCIATION

The annual meeting of the Connecticut Veterinary Medical Association was held at the Hotel Guard in Hartford February 1, 1922. At this meeting a communication was read from Dr. John R. Mohler, Chief of the Bureau of Animal Industry, informing the association that the holding of a Tuberculosis Conference under the direction of the Bureau of Animal Industry, in cooperation with the Veterinary Medical Association and the Live Stock Sanitary Officials of this State, met with his approval. It was also voted that this conference should not only include the New England States, but that invitation should also be extended to New York, New Jersey and Pennsylvania, inviting them to participate in the proceedings of this meeting, which will be held at Hartford, Conn., during the first week in June.

GEO. E. CORWIN, *Secretary*.

VETERINARY COURSE IN CALIFORNIA IS WELL ATTENDED

One of the biggest events of the Short Course Week at the University Farm, Davis, Calif., was the Veterinary Practitioners' Conference. The veterinarians came from all sections of the State, and some from the East. The program for the week was arranged by the California State Veterinary Medical Association in cooperation with the Division of Veterinary Science of the University of California. Dr. J. F. McKenna was Chairman for the week.

There were special lectures given by D. H. Udall, head of the Department of Medicine, Obstetrics and Ambulatory Clinic.

College of Veterinary Medicine, Cornell, New York; K. F. Meyer, Professor of Research Medicine, University of California; and B. H. Rawl of the Central Creameries, formerly Assistant Chief of the United States Bureau of Animal Industry.

These lectures were based entirely on diseases of cattle, tuberculosis and the value of accredited herds. Demonstrations were held almost daily at the clinic.

Officials from the outside cooperating were:

University of Nevada: Edward Records, Stephen Lockett and Lyman Vawter. State: G. H. Hecke and J. P. Iverson. Federal: Lieut.-Col. Van Agnews and Robert Jay.

J. Traum in his lecture on accredited herds was strong in trying to bring to California the value of accredited herds. There seems to be a feeling, he said, that unless the California dairymen adopt the movement now on foot all over the United States the bottom will drop out of the California dairy market.

WISCONSIN VETERINARY MEDICAL ASSOCIATION

The association held its annual meeting in the Senate Chamber and was called to order by Dr. A. J. Abbott, of Marshfield, President. The address of welcome was made by C. P. Norgord, Commissioner of Agriculture, who officiated for the Governor. This was responded to by Dr. L. A. Wright, of Columbus.

The first afternoon was devoted to routine business and the election of officers. Dr. H. E. Horel, of Augusta, was elected president; G. H. Harland, of Pewaukee, vice-president; W. H. Richards, of Morrisonville, treasurer; R. S. Heer, of Platteville, succeeds himself as director, and O. H. Eliason was elected secretary.

After the business was disposed of the association listened to a paper on "Mastitis," by Dr. W. F. Nolechek, of Throp, Wisconsin, and "Control of Roup and Chicken Pox," by Dr. A. B. Beach, of the College of Agriculture.

The evening session was spent in listening to addresses on "The Study of Feeding of Farm Animals," and "The Type and Breeds of Farm Poultry." Profs. J. M. Fargo and J. G. Halpin, of the College of Agriculture, gave excellent papers on these subjects.

Thursday morning's discussion was on the subject of "Hog

Cholera and Other Related Swine Diseases," and Dr. T. P. White of Washington, in the office of Hog Cholera Control, was present and added his observations on that subject.

The afternoon discussion was on the subject of tuberculosis, with special reference to the accredited herds, and the general program was supported by Dr. Enos Day, of Chicago, special investigator for the Bureau of Animal Industry who added materially to the day's program.

At 6:30 p. m. one hundred and fifty attended the banquet in the State Capitol Café, presided over by Dr. C. A. Deadman, and a profitable evening was enjoyed by all. The program was opened by the Honorable John J. Blaine, Governor of Wisconsin, who told of his appreciation of the work of the veterinarians in Wisconsin in the eradication of animal diseases and expressed the hope that Wisconsin might soon eradicate tuberculosis among cattle within the borders of Wisconsin. Other speakers were Wayne Dinsmore, of Chicago, Secretary of the Horse Breeders' Association of America; Dr. H. D. Pattison, of Beloit, who gave a toast to the ladies and brought down the house with his humorous stories which he is so capable at telling; Dr. O. H. Eliason, who told of his experiences as State Veterinarian for the past ten years, and Commissioners C. P. Norgord, who told of the State Department of Agriculture.

Friday was devoted to an extensive clinic at Dr. J. P. West's hospital on Washington avenue. This was very well attended and a profitable day was spent.

O. H. ELIASON, *Secretary*.

DATE OF MEETING OF SOUTHEASTERN STATES ASSOCIATION CHANGED

The executive committee of the association decided it would be of best interest for the members and all veterinarians to change the date of the next meeting, which is to be held in Nashville, Tenn., and definitely fixed the convention date for March 13 and 14, 1922.

The change was necessary on account of conflicting dates with other meetings in which many veterinarians are interested, and a larger attendance has been assured on the date of March 13 and 14.

Among the speakers appearing on the program who will address the association will be found the names of Dr. A. T. Kinsley, President of A. V. M. A.; Dr. B. H. Ransom, Chief Zoological Division, B. A. I.; Dr. L. A. Klein, University of Pennsylvania, and other prominent veterinarians.

One session of the convention will be given exclusively to papers and discussions of parasitic diseases of swine and young cattle, and another session to papers by State Veterinarians of each of the Southeastern States. A clinic will be held on the afternoon of the last day, March 14, at the hospital of Dr. Wm. Bell, Nashville, Tenn.

All the veterinarians of the adjoining states are especially invited to attend this meeting. Programs will be mailed from the Secretary's office on February 20. Any veterinarian not receiving a copy will be furnished one by notifying the Secretary.

JNO. I. HANDLEY, *Secretary*.

NEW MEMBER OF EXECUTIVE BOARD

The result of the ballot for a member of the Executive Board of the A. V. M. A. from the Sixth District is as follows: B. W. Conrad, Sebetha, Kansas, 124; D. F. Fox, 99; H. Jensen, 99; J. H. Bux, 15; N. F. Williams, 15; unsigned ballots, 5; scattering, 2.

N. S. Mayo, *Secretary*.

Gov. W. P. G. Harding, of the Federal Reserve Board, in an analysis of the business situation, told members of the United States Potters' Association, in session at Wahington, that conditions throughout the nation are much better than they were a year ago and that America is on the verge of a great revival. He said: "The readjustment is not completed in some lines, as the farmer is not yet back to normal conditions. Until he gets his normal purchasing power we will not really have normal times; but the farmer's condition has materially improved, being benefited by the War Finance Corporation."

A monument to the late Professor Arloing has been erected at Cusset, France. Professor Leclainche was designated to represent the Academy of Sciences at the ceremonies.

NECROLOGY

It is with much regret that the JOURNAL chronicles the death on February 4, of Dr. R. A. Archibald, practitioner and President and Manager of the Western Laboratories, Oakland, California. Dr. Archibald had been in poor health for a period of three years following an attack of influenza in December, 1918. Congestion of the brain was the immediate cause of death.

Dr. Archibald was born in Queens County, Ireland, in 1870. He came to the United States in 1887, shortly thereafter entered the Chicago Veterinary College, and graduated from that institution in 1891. He had been active in veterinary circles ever since that date, having been fourth vice-president of the A. V. M. A. in 1914 and president in 1916. He was a member of the Executive Board for the last five years.

Dr. Archibald had specialized in bacteriology, and in 1899 became Assistant Bacteriologist of the City of Oakland. He was appointed to the Professorship of Bacteriology in the Oakland College of Medicine and Surgery in 1908, and to a similar office in the San Francisco Veterinary College in 1909. He was in charge of food inspection and city veterinarian in Oakland for 16 years. He was three times elected President of the California State Veterinary Medical Association, and was for fifteen years a member of the California State Board of Veterinary Examiners, which stamps him as the veterinary leader of the Pacific Coast.

Dr. Archibald contributed considerably to veterinary literature. Among his writings may be mentioned "Apparent In-



R. A. ARCHIBALD
President of the American Veterinary
Medical Association 1915-1916

consistencies of Biologic Diagnostics," "Preliminary Report on the Value of Leukocytic Extract from a Therapeutic Standpoint," and "The Laboratory and Its Relation to Medical Science."

Shortly after his graduation, Dr. Archibald went from Chicago to California to establish a veterinary practice, and as he was wont to say, "did not travel in a Pullman." Through the acquisition of valuable land, he built up considerable revenues for himself and in connection with his veterinary practice and the production of biological products, had amassed a very snug fortune. His death, which is mourned by his widow and a legion of loyal friends, removes another strong exponent of the veterinary profession in the United States.

TUMORS IN ETHMOID BONES OF HORSES

In a recent congress of pathologists at Stockholm, Sweden. Henschen of Stockholm demonstrated specimens of tumors grown in the ethmoid bones of horses. During the last few years this disease had assumed an epizootic character in Sweden and was included with diseases which the veterinarian must report. Clinically, the disease started as an acute suppurative rhinitis, which became chronic and assumed a hemorrhagic nature. Later, several tumors became visible. The histologic examination of each growth shows a number of tumors of different character; side by side occur carcinoma, adenocarcinoma and papilloma. The multiple appearance of the tumor, its polymorphism, the clinical history and the presence of lymphoid cell infiltrations make one believe that the etiology may be an organized virus. No attempts to demonstrate this, nor any transplantation experiments have, however, succeeded.

Hoard's Dairyman says: "Moscow Township (Mich.) has the distinction of being the first township in the U. S. in which all breeding cattle have been tested for tuberculosis. The entire campaign (covering the whole county of Hillside) was very successful in the opinion of all concerned, and the Bureau of Animal Industry has demonstrated what can be done to aid in the eradication of this disease with which 11 per cent of the swine and nearly 3 per cent of the cattle of the United States are affected."

MISCELLANEOUS

MEMORIAL MEETING TO DEAN HOSKINS

A memorial meeting was held at the New York State Veterinary College, New York University, on Monday evening, December 12, 1921, in honor of the late Dean W. Horace Hoskins. A portrait of Dean Hoskins was draped with the American and College flags. Dr. W. G. Hollingworth, president of the Alumni Association, presided. The services were opened by prayer by the Rev. Guthrie Spiers.

The first speaker was Elmer Ellsworth Brown, Chancellor of New York University. Chancellor Brown's address was particularly impressive in its sincerity. There could be no mistake as to his feeling toward Dean Hoskins, a man of whom he had become very fond. He had met but few men who had the ability of Dean Hoskins to carry his high ideals of his profession so ably to others, peculiarly associating his work always with the love of his country. Dean Hoskins' enthusiasm, logic and ability at once attracted the attention and sympathy of every department of the University to the Veterinary Department.

The next speaker was the Rev. Guthrie Spiers, who spoke in the absence of Dr. Hoskins' very close friend, the Rev. George Alexander, pastor of the University Presbyterian Church. Dr. Spiers had found Dean Hoskins' life an unusual blending of a Christian spirit with his work. He mourned the fact that a man with such wonderful energy and numberless interests could not have been spared, but it was plain to even a casual observer that his boundless energy was fast burning up his life.

Dr. John P. Munn, member of the Council of the New York University, spoke next. It was, indeed, good to listen to the inspiration breathed by this good old friend of the veterinary profession. He told so beautifully what Dean Hoskins had done for the "old school," and what his profession had done for the country, adding that Dean Hoskins is not dead, but has simply gone; his spirit will never die. This being so, he pleaded for the support of all to continue the glorious task that the Dean had undertaken.

Dr. V. A. Moore, Dean of the Veterinary Department of Cornell University, then recited some of the strong, brave qualities

of Dean Hoskins. He had always admired the Dean for his courage and his loyalty to any cause he represented.

Dr. Moore was followed by Dr. John Adams, representing the Veterinary Department of the University of Pennsylvania. Dr. Adams had known Dean Hoskins more or less intimately for thirty years. He was always impressed with the quiet dignity of the man, his wonderful interest in all things, his sympathetic nature fitting so beautifully with his work, his clean mind, being too much absorbed in big things to be interested in unclean things, and his outstanding natural ability as a leader, always planning, organizing and improving the upbuilding of his profession.

Dr. L. D. Ives next spoke as a representative of the United States Department of Agriculture. Dr. Ives expressed gratitude for the many things that Dean Hoskins had done to help the men in the Bureau of Animal Industry, this emphasizing his many activities and the influence he had on so many phases of his profession.

The Veterinary Corps of the United States Army was represented by Col. Gerald E. Griffin. It is as a member of the Army Legislative Committee, he said, that Dean Hoskins' tenacity and almost superability stand in such bold relief. Col. Griffin told interestingly of Dean Hoskins' eighteen years of persistent laboring in behalf of the Army veterinarians. It is only by knowing the trials and vicissitudes of this work and the barriers to be overcome that one can realize what this man did for the Army veterinarians. All this proved so plainly to those who were in touch with it that Dean Hoskins never had a personal ambition. His sole thought was the betterment of every branch of his chosen profession.

Dr. J. F. DeVine next spoke as a representative of the American Veterinary Medical Association, mentioning that Dean Hoskins had been a member of this Association for thirty-six years without ever missing a meeting, that he had served five years as its Secretary and three years as its President, and that his continued interest in the service of the American Veterinary Medical Association was without parallel in our profession.

The next speaker was Prof. William Herbert Lowe, representing the Veterinary Department of the New York University. He mentioned that he had already expressed his great admira-

tion for Dean Hoskins in an article he had recently furnished the journals. He wished to emphasize that one of the prominent things of Dean Hoskins' life that will keep his memory alive was service.

Dr. W. Reid Blair represented the New York State Veterinary Medical Society. Dr. Blair's remarks were a splendid testimony to the loyal qualities of Dean Hoskins.

Dr. Robert McKeller, representing the Veterinary Medical Association of New York City, spoke of some of the great assistance that had come from Dean Hoskins to this Association, and that the spirit of his work was sure to leave its influence upon the Association.

Dr. R. E. Mosedale expressed for the New Jersey State Association the sadness occasioned by the loss of Dean Hoskins.

The student body of the Veterinary College then presented the following resolution:

RESOLUTION ADOPTED AT MEETING OF THE VETERINARY STUDENTS' ASSOCIATION OF NEW YORK UNIVERSITY, OCTOBER 2, 1921

WHEREAS, It has pleased Almighty God to remove from our midst on August 10, 1921, our late Dean, Dr. W. Horace Hoskins, into a kingdom greater than that on this earth. The unseen hand of an all-wise Providence has taken one of our staunchest advocates for a united and brotherly interest among practitioners and students. In his capacity as Dean, we found him to be a guiding light, true and sincere friend and fatherly counselor, and largely through his efforts the noble work of the veterinary profession has been brought before the entire country.

Therefore Be It Resolved, That the Veterinary Students' Association, in meeting assembled, takes this means of expressing their heartfelt sympathy and offer sincere condolence to the bereaved wife of our benefactor.

Be It Further Resolved, That a copy of these resolutions be read at the memorial meeting and then presented to his beloved wife, Mrs. W. Horace Hoskins.

Be it Further Resolved, That a copy of these resolutions be incorporated in the minutes of the Students' Association of the New York State Veterinary College at New York University.

T. C. RALSTON, President; JOHN W. WATT, Vice-President; L. ROTH, Secretary; A. W. MEYER, Treasurer.

NEW HOOKWORM TREATMENT MAY BE USEFUL IN HUMAN MEDICINE

The toll exacted from the livestock industry by internal parasites such as worms is enormous, and because of this drain on the herds and flocks the scientists of the Bureau of Animal Industry keep up an unflagging search for chemicals and treat-

ment that may be used to combat these organisms. Recently they have discovered that a certain chemical once used in medicine as an anesthetic and now used variously as a fire extinguisher, cloth cleaner, insecticide, and solvent for fats and gums, is very effective as a destroyer and expeller of intestinal worms. The name of this chemical is carbon tetrachloride.

The effectiveness of this chemical against certain round worms has been announced by the Department, but what may be the most beneficial use has just been brought out by tests on animals infested with hookworms. In the case of sheep the minimum effective dose has not yet been determined, but all the doses used, from 12 cubic centimeters to 48, in each case given in 2 ounces of castor oil, removed all stomach worms and all hookworms. It has been equally effective for hookworms in dogs and foxes, and has been used with success against some of the various kinds of worms that infest the digestive tract of pigs.

The fact that a species of hookworm also affects man makes this discovery of the efficacy of this chemical against hookworms in various animals of interest to medical men as well as to veterinarians. Medical men are now trying it out at several places as a possible cure for hookworm disease in man, and it gives promise of success. As a result of the work so far completed, it is believed that this drug will prove of special value in the removal of the various kinds of blood-sucking worms in domestic animals.

FEWER VIOLATIONS OF FOOD AND DRUG LAW

The manufacturer who violates the Federal Food and Drug law today is an artist compared with the violator of a few years ago. He does not offend so frequently or so flagrantly, but he is harder to catch. The gross and crude violations so frequently found during the early days of the law's enforcement by the U. S. Bureau of Chemistry have given place to more subtle forms that, to be detected, require more careful investigation. On the whole, violations are much less frequent. Only a small portion of the food and drugs in interstate or foreign commerce is either adulterated or misbranded.

In the enforcement of this law during the last year 1,677 shipments were seized and 608 criminal prosecutions ordered.

The seizures and prosecutions recommended were based most frequently upon shipments of patent medicines, including stock remedies and stock feeds.

The activities of the year on patent medicines included 866 actions directed mainly toward the elimination of false and fraudulent claims on the labels regarding curative powers for a great variety of diseases. The stock feed cases, 152 in number, were based on products deficient in protein or otherwise failing to conform to the claims made upon the labels.

So-called lithia waters containing only the merest traces of lithium, but alleged to be of the greatest therapeutic value because of their lithium content, have been virtually eliminated from the market. Interstate commerce in mineral waters and other drugs alleged to contain radium which were put on the market following the announcement that radium effected wonderful cures, threatened to develop to large proportions, but was stopped before it attained much momentum.

Effective campaigns have been carried on to eliminate from interstate commerce shipments of milk and cream highly contaminated with bacteria. Some contaminated mineral springs have been closed, while in others the manner of handling the product and of purifying it have been revolutionized. Methods have been devised for the detection, by means of the microscope, of decomposed fruits and vegetables in prepared food products. Investigations have been made to establish as fully as possible the character of the practices necessary to protect consumers from food poisoning, and the information has been disseminated widely.

USE FOR A HORSE

Our township trustee sent a physician to render service to an indigent family. The physician noticed an emaciated horse in a ramshackle shed and asked: "What use have you for a horse?" "We use him to go out into the country and haul in hay for him," replied the head of the household.—*H. D. F. in Journal of the American Medical Association.*

Dr. Henry M. Graefe, inspector in charge of the United States Bureau of Animal Industry, stationed at Topeka, Kansas.

had a narrow escape from asphyxiation on January 9, when he was overcome by the fumes of a gas stove in his home.

Dr. Graefe's life was probably saved by his wife, who dragged him out of the bath room after she had heard him fall.

Dr. D. F. Luekey, for many years State Veterinarian of Missouri, has resigned his position in order to accept the appointment of Livestock Commissioner with the St. Louis Live Stock Exchange, where he will concentrate his efforts on the control of animal tuberculosis. The JOURNAL wishes to congratulate the Exchange in securing the services of such a competent, energetic and painstaking official.

Dr. F. E. Barnes, resident secretary of the A. V. M. A. for the State of Texas, has just been reappointed a member of the State Veterinary Medical Examining Board of that State. Dr. T. W. Watson, of Corsicana, has also been appointed a member of the Examining Board.

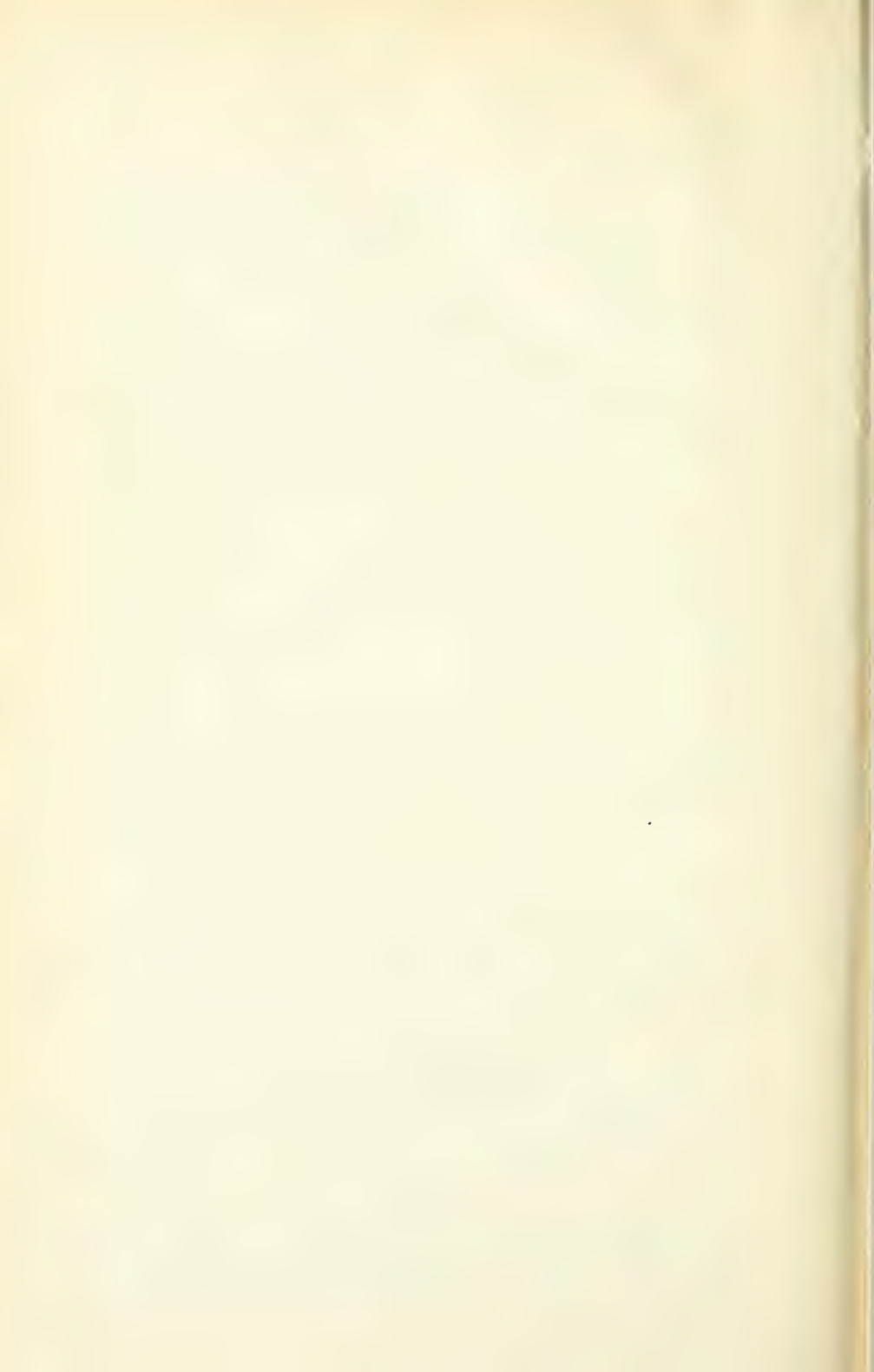
Dr. J. O. Young, of 626 Clay Street, Topeka, Kansas, has just moved into his new home, and his new veterinary hospital is nearly completed. The hospital is built of stone of modest construction, and will be arranged to care for both large and small animals.

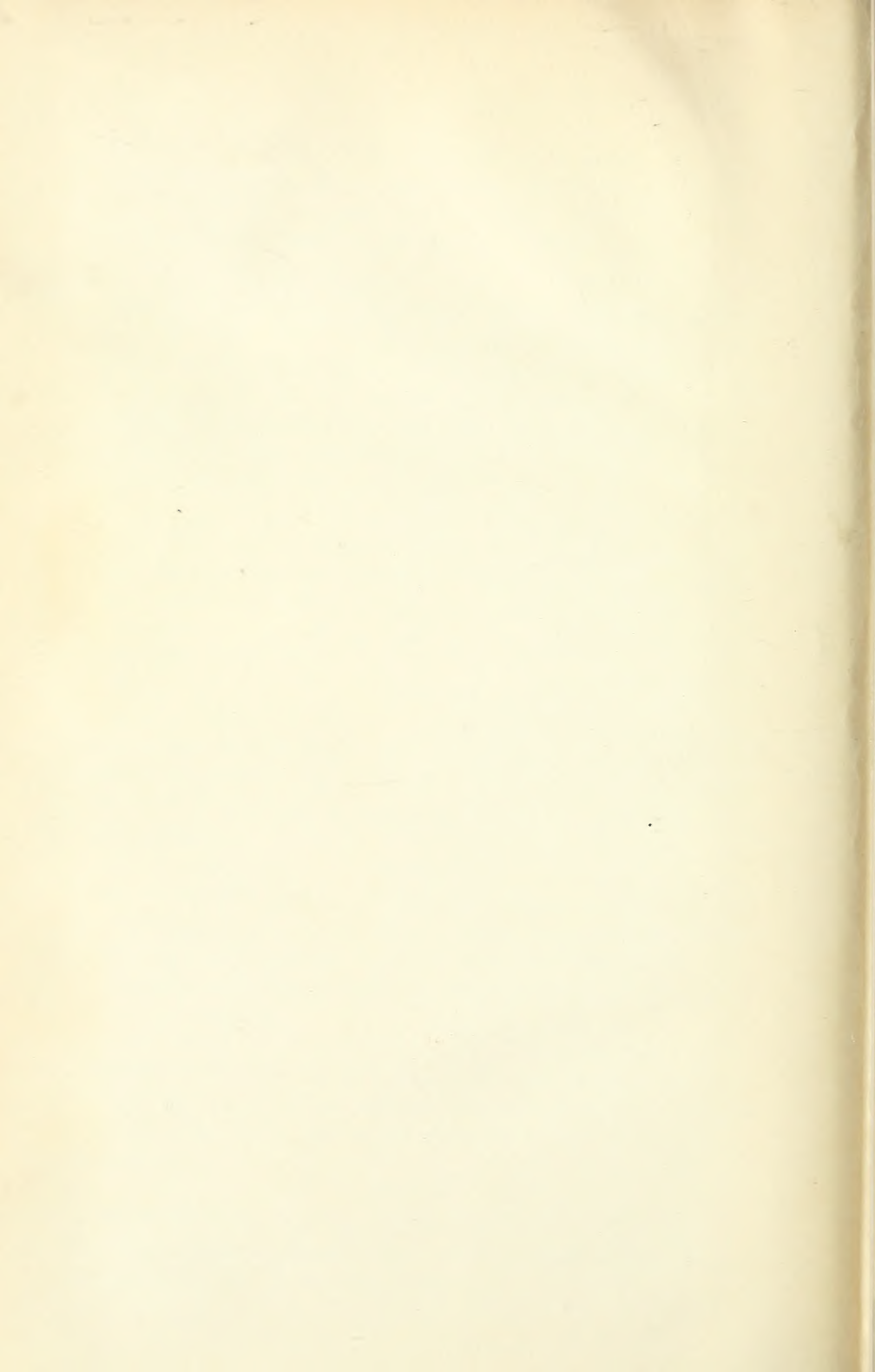
Dr. C. C. Winegardner, of Goshen, Indiana, has been in Indianapolis, Indiana, taking the two weeks' post-graduate course at the Indiana Veterinary College. He reports having received much useful information from the excellent lectures and clinics given in the course.

Dr. C. W. Bowers, of 1117 Kansas Avenue, Topeka, Kansas, is completing a new home and has also started work on a new veterinary hospital. The doctor has faith in the future of his profession.

Dr. G. W. Browning, who has been in practice at La Grange, Ga., has moved to Mobile, Ala., with enlarged facilities and equipment for his professional work.









SF American Veterinary
601 Medical Association
A5 Journal
v.60
cop.2
Biological
& Medical
Serials

PLEASE DO NOT REMOVE
CARDS OR SLIPS FROM THIS POCKET

UNIVERSITY OF TORONTO LIBRARY

STORAGE

